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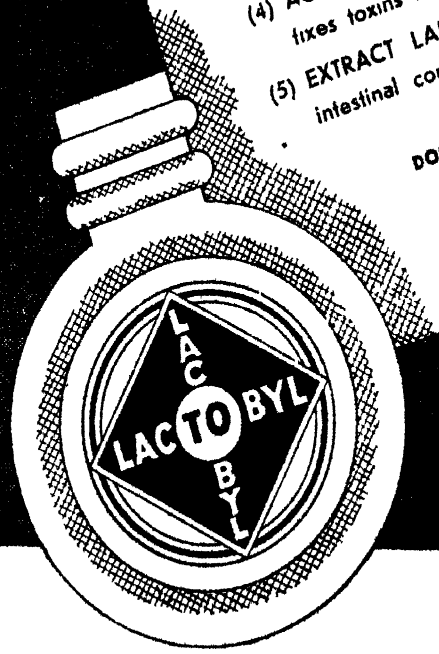

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THE PRACTITIONER

No. 820 OCTOBER, 1936 Vol. CXXXVII

MEDICAL PROGRESS 1935-36

By Sir MAURICE CASSIDY, K.C.V.O., C.B., M.D., F.R.C.P.

Physician Extraordinary to H.M. the King; Senior Physician, St. Thomas's Hospital.

BEYOND all question the most important advance in medical progress of recent years has been the recognition that psychological factors play an overwhelming part in the causation of invalidism, taken as a whole. It is now known that in panel practice and in industrial medicine, the commonest diagnoses are "debility," "dyspepsia," "gastritis," "anæmia," "neuralgia," "tachycardia," and so on. And it is also known that the great majority of patients who are so diagnosed are really the victims of some psychological disorder, usually an anxiety state or a conversion hysteria. Moreover, this state of affairs is not confined to the hospital class of patient. These psychological disorders are even more prevalent among the well-to-do classes. They constitute, for example, 30 per cent. of the cases seen in consulting cardiological practice. But though headway has been made in respect of psychological diagnosis, progress in the matter of psychological treatment remains lamentably slow. It is a small minority of these unfortunate sufferers who receive the only form of treatment from which they are likely to derive lasting benefit, namely efficient psychotherapy. In hospital practice, for example, once the case has been fully investigated and the damning decision has been made that there is "no evidence of any organic disease," the invariable reaction of all but the most enlightened of resident medical officers is to get rid of the patient as rapidly as possible, he cares not where. And there is, as a matter of fact, little or no provision for the psychotherapy of hospital in-patients, though tentative steps have been taken so far as out-patients are concerned. It is indeed astonishing that, although the importance to the State of psychological illness is generally recognized, in the average general hospital of, say, 600 beds not a single bed is allotted to the psychological department. It is reassuring, however, to hear that this problem has not been lost sight of in the reconstruction of certain hospitals.

It is also being learnt that it is not only when there is no organic disease that psychotherapy can, and should, be employed. Even when there is a basis of sometimes quite gross and severe organic disease there is often an added element of anxiety state or hysteria, the manifestations of which may be disabling but amenable to psychotherapy. For instance, it is by no means uncommon to see a patient with mitral stenosis, or congenital heart disease, who is invalided by the engendered anxiety disorder rather than by the original organic lesion, serious though this may be. Years ago Hurst showed what could be done by psychotherapy for the patient crippled by rheumatoid arthritis, when the physical disability is not in fact as complete as she believes it to be. Again, with organic disease of the nervous system, such, for example, as disseminate sclerosis, psychotherapy may considerably reduce the degree of invalidism. Years ago, my colleague, the late Dr. J. J. Perkins, used to plead for courage on the part of the medical profession when dealing with pulmonary tuberculosis. There was at that time a prevalent tendency not to make the unpopular diagnosis of "phthisis," but rather to speak in guarded terms of "a patch on the lungs," and so forth. Fortunately no such advice is now necessary, but it must be confessed that many doctors to-day shrink from telling their patients that there is no organic basis for the symptoms of which they complain.

A diagnosis of "colitis" or of "conjunctivitis" for abdominal or orbital pains of psychological origin is always more popular with the patient than is the true diagnosis, and it is only too tempting for the medical man to take the line of least resistance. He knows that the patient will be almost proud of having "colitis," whereas if told that his trouble is psychological he will retort, "Do you mean to tell me that it is only nerves?"—and may migrate to another doctor. But every practitioner wants to do the best he can for each individual patient, and although by honesty and courage in psychological matters he may from time to time lose the type of patient who wanders from doctor to doctor until obtaining the most likeable diagnosis and treatment, in the long run honesty is the best policy for the practitioner as well as for the patient.

CARDIOVASCULAR DISEASE

I shall leave reference to progress in cardiology to the able pen of Dr. William Evans, but I would like to call attention to the recent work of Lewis and his collaborators, who have done so much to clarify our knowledge of disturbances of the peripheral circulation, especially in respect of Raynaud's disease and acrocyanosis. By degrees the indications for, and the benefits which can be expected from, the various forms of sympathectomy are being learnt, and claims have been made for such treatment even in obliterative arterial disease of the limbs. But it must be confessed that in most cases the practitioner is powerless to ameliorate this condition, which is undoubtedly becoming more prevalent. Arteriography, that is to say, the radiology of arteries made opaque to X-rays by the preliminary injection of thorotrast, is being performed with increasing frequency and success. It is now a comparatively simple matter to demonstrate an aneurysm of the internal carotid artery by this means. Recently an enterprising radiologist has elaborated a technique for the radiology of the pulmonary circulation. A soft catheter is passed, under radiological control, up the brachial vein and thence via the superior vena cava into the right auricle. Thorotrast is then injected and a short-exposure film is taken, demonstrating the pulmonary artery and its branches. The procedure is said to be devoid of risk, but most practitioners will wonder if the results achieved are commensurate with the risk which surely must be associated with such a technique.

The surgeon is invading the realms of the cardiologist as he has done, with such brilliant success, those of the lung specialist. He has achieved promising results in Pick's disease, chipping away the calcified pericardium and freeing the pericardial ostia of the superior and inferior venæ cavæ. There is no doubt, too, that total thyroidectomy, in carefully selected cases of heart failure, congestive or anginal, is sometimes successful. It is to be hoped, however, that this operation may not be discredited by an injudicious choice of cases for it.

CHEST DISEASES

As to the thoracic surgeon, he has continued to perfect his technique during the past two years, and the lobectomies which he is able to perform with steadily decreasing operative risk have rescued many subjects of bronchiectasis from invalidism and death; and this, moreover, with astonishingly little post-operative deformity. We have unfortunately to deplore the death of Dr. Scott Pinchin, who, with his colleague, Dr. Morlock, has demonstrated the value of the bronchoscope in both the diagnosis and the treatment of pulmonary abscess and of bronchiectasis.

From time to time isolated successful resections of œsophageal carcinomas have been reported, and it would seem probable that this operation may be attempted more frequently in the future, and with a greater chance of success, always assuming that such patients are sent at an early stage of the disease to a surgeon experienced in thoracic surgery.

GASTRIC ULCER

If I may be allowed for a moment to poach on the preserves of Dr. Arthur Hurst, I would suggest that the pendulum has swung a little too far from the surgical treatment of gastric ulcer. It is known that the operation of gastro-enterostomy was discreditably exploited some years ago, and consequently fell into disrepute, so much so that it is now sometimes a little difficult to persuade a practitioner to allow his patient to undergo this operation, or one of its variations, even when the indications for surgery seem to be clear. It is gratifying, however, that such operations as cæcopexy and colectomy have sunk into the obscurity from which they should never have emerged.

BLOOD DISORDERS

So far as hæmatology is concerned, perhaps the most remarkable feature of the past two years has been the increasing frequency of agranulocytosis, and the implication of amidopyrine in its etiology. I am hoping that Dr. J. F. Wilkinson will be able to explain why many practitioners have been able in the past to prescribe this drug extensively and apparently with impunity. He will also no doubt comment on the fact that the parental administration of concentrated liver extract is at the same time the cheapest and the most efficient method of treating pernicious anæmia, and I feel sure that he will also deplore the frequency of relapses and the development of spinal cord changes due to inadequate treatment. Surely the time has come for a co-ordinated effort to be made to ensure that every sufferer from pernicious anæmia receives adequate treatment, controlled by periodical blood counts. At present it must be confessed that this is the case in only a few special clinics, of which that organized by Dr. Wilkinson is a model.

PHYSIOTHERAPY

Dr. C. W. Buckley will refer to the increasing use of modern methods of physiotherapy, which has been a striking feature of the period under review. There is no doubt that the national physique will be benefited by properly taught physical exercises, the importance of which both to the adolescent and to the adult is generally recognized. It is, however, still a matter of regret that many public schools are backward in this respect, and that in many of them no attempt seems to be made to eradicate the "school-boy's slouch," so slovenly and so unhygenic, and yet, in certain schools, so fashionable—for a fashion it largely is.

CONCLUSION

Finally, I would remind my readers that all medical progress is not necessarily progress in the right direction. There is, for instance, a growing tendency towards over-elaboration in laboratory investigation. It is quite right and proper that, when the clinical diagnosis is uncertain, any and every investigation should be made which can conceivably throw any light on the problem. But elaborate investigations are often made almost as a routine, so that patients suffering from what seem to be straightforward and easily recognizable diseases may be subjected to the whole gamut of laboratory investigations, hæmatological, bacteriological and biochemical. At the risk of being considered to be reactionary, I venture to suggest that this sort of thing is not true progress.

SURGICAL PROGRESS 1935-36

BY SIR DAVID WILKIE, M.D., CH.M., F.R.C.S.

Professor of Surgery, University of Edinburgh.

DURING the past few years there has been a remarkable two-fold movement in surgical outlook and practice—on the one hand a tendency to conservatism with reluctance to employ the radical surgical measures of yesterday and, on the other hand, an increase of activity and enterprise in the employment of operative measures for conditions in which, some years ago, they would have been deemed unjustifiable. In this review it is proposed to consider certain conditions illustrative of these two tendencies and at the same time refer to one or two developments which stand out by themselves.

THE TREATMENT OF ACUTE INFECTIONS

To those who, following the lead of Bier, have for many years advocated a conservative attitude in dealing with acute infection, no matter in what tissue it was found, the widespread adoption of expectant and medical measures to the exclusion of active surgery has come as a welcome change.

Acute osteomyelitis.—The local manifestations in the bone are now coming to be regarded as but a part of this disease, which is essentially a blood infection. At one time it was the widely accepted teaching and practice that early diagnosis followed by immediate and free opening of the bone was the best treatment. This has been widely challenged and the contrary view—that free opening means the opening of pathways to the blood stream and an undoing of Nature's effort to confine and localize—is gaining ground. What is to be done in the case of a child obviously ill and with the signs of osteomyelitis of the upper end of the tibia? Septicæmia and pyæmia are the complications feared; the tedious local changes take a secondary place. An endeavour is made to localize the infection by applying a Bier's bandage to the thigh, applying hot fomentations to the painful part, and giving 20 c.cm. of staphylococcal antitoxic serum. In my experience this serum is a life-saving agent, the solid value of which is not yet fully realized. The opening of the bone is not a matter of great urgency. When much local pain is present it is wise, under gas and oxygen anæsthesia, to cut down, incise the periosteum and make one or two small drill holes into the bone. A vaseline dressing may then be applied and the limb encased in plaster of Paris after the method of Winnett Orr. In cases in which local pain in the bone is not severe a still more conservative attitude is wise, and the appearance of subperiosteal pus should be the first signal for active interference.

This shifting of the weight from local interference to general measures is evident in the treatment of acute infection of the soft parts as in those of bone. In the case of an infected punctured wound of the finger with lymphangitis, local heat, Bier's congestion and anti-streptococcal serum, and not incision, constitute the rational treatment of to-day. Foster the defensive mechanism and beware of breaking Nature's own protective barriers are the watchwords of our treatment.

Carbuncle.—In the case of no other disease are more diverse methods employed in treatment. From total excision of the whole infected area, cruciate incision and removal of sloughs, or treatment with X-rays, to occlusion with firmly applied strips of elastoplast, treatment may range from the ultra-radical to the supremely conservative. This merely shows that there is a great tendency to natural cure, no matter what is done. After experience with all methods I am most impressed with the occlusive form of treatment. Whether it be that under a confining and occlusive dressing there is a development of bacteriophage—that agent which multiplying with the bacteria leads to their destruction—or merely that by rest the natural protective forces are allowed unhampered to pursue their steady course, the results of occlusive treatment are gratifying from every point of view. The use of staphylococcal antiserum in profoundly toxic cases of carbuncle is now of proved value.

Peritonitis.—The treatment of the patient with diffuse peritonitis and paretic distension of the intestine has again engaged much attention. A great body of evidence is now available in favour of the conservative line of treatment of such cases—a return, with certain notable improvements, to the methods of fifty years ago. The use of the indwelling duodenal tube to preclude gastric distension, continous intravenous saline infusion by the drip method to make good dehydration and chloride loss, hot fomentations over the abdomen, and morphine by hypodermic injection and leaving the bowels to act in their own good time, these are the essentials of the treatment. The use of repeated doses of drugs such as pituitrin, prostigmin and pitressin is to be deprecated in the presence of peritoneal infection. Only when colicky pain indicates some organic obstruction from kinking is enterostomy advisable. One useful addition to treatment has been suggested and practised successfully by Fine. By making the patient breathe practically pure oxygen, and thus increasing the oxygen tension of the blood, he showed that nitrogen was absorbed from the distended bowel into the blood stream and the tension and portal stasis lessened. This method deserves a thorough trial.

BURNS AND FRACTURES

Treatment of burns.—Further evidence of the value of the tannic acid method of treatment has been furnished. The tendency is now to use stronger solution than the 2½ per cent. first advocated by Davidson. Strengths of 5 up to 20 per cent. have been used with success and the incorporation of some antiseptic, such as acriflavine, 1 in 1,000, or a silver salt, helps to counter sepsis. In cases of severe burns in which, on the second day there is ominous failure in the peripheral circulation, Wilson has shown that striking benefit may result from repeated administration of eucortone, the extract of adrenal cortex.

Treatment of fractures.—There is a growing recognition of the necessity for an organized fracture service throughout the country. The figures published during the past year have been eloquent testimony to the incomparably better results of the intensive methods of dealing with fracture cases. The principles applied by Böhler, of accurate reduction, skin-tight plaster and early function have gained increasing recognition and have led to an improved standard of result both from the anatomical and the functional standpoints. Fracture of the neck of the femur has been the subject of outstanding interest in this field. The use of a nail driven in through the base of the trochanter along the neck into the head of the bone, as recommended by Smith Petersen, has been tried out in a large number of cases. The extensive open operation practised by Smith Petersen has now been, to some extent, replaced by a less formidable procedure, using a wire guide controlled by X-ray observation to permit of accurate driving of the nail. It is as yet too early to say what the ultimate place of this type of operation will be. It is unquestionable that in the hands of some experts admirable functional results are obtained. On the other hand, the bad results are deplorable. As Whitman has shown, it is not the only method of obtaining bony union, and for those who have neither the experience nor technical equipment for carrying out the nailing operation under the best conditions the use of one of the methods of fixation in abduction by plaster is to be preferred.

SURGERY OF PEPTIC ULCER

In no other branch of medicine has the contrast between the conservatism which has been the dominant note in this country for some years and the ultra-radical surgical measures of continental countries been so striking. With us an ever greater discrimination in the selection of cases for surgical interference has been practised. The indications for operation are restricted to: (1) old-standing ulcer with stenosis and food retention; (2) intractability to repeated careful medical treatment; (3) recurring hæmorrhages; and (4) chronic gastric ulcer in which suspicion of malignancy cannot be excluded. The operation of gastro-jejunostomy still holds the field for cases of duodenal ulcer with stenosis and moderate acidity. If after-care be exercised, the risk of stomal ulcer in this type of case is negligible. The intractable case without stenosis but with high acidity is a poor subject for surgery and any type of operation, whilst it may be completely successful, is liable to be followed by stomal ulceration. An increasing number of surgeons in this country have followed the lead of Finsterer and now carry out partial gastrectomy in these cases. The conservative gastrectomy, in which the pyloric antrum is conserved, is suitable in this type and in practised hands has a low mortality.

In cases of hæmorrhage decision as to operation is often difficult. If the patient has previously been examined radiologically and a chronic ulcer is known to be present, and if there has been a previous hæmorrhage, and if the existing one does not stop after blood transfusion, then operation should be undertaken. The improved facilities for blood transfusion and the benefits of the continuous-drip method of giving blood have rendered what was formerly a hazardous procedure now relatively safe. Unless either from previous X-ray evidence or from a long-standing typical history a chronic ulcer is known to be present, operation should not be undertaken. The operative procedure should consist either of a radical ablation of the ulcer-bearing area or, in the case of duodenal ulcer, ligation of the gastro-duodenal artery, narrowing of the pylorus and a gastro-jejunostomy.

SURGERY OF THE THYROID GLAND

An *adenoma* of the thyroid should be removed. There is increasing evidence that the fœtal adenoma of the thyroid is the most frequent starting point of malignant disease of the gland. Moreover toxic symptoms are prone to develop in cases of adenoma and in later life are especially liable to be characterized by cardiac disability. Lastly, sudden hæmorrhage into the adenoma may result from some strain, and the sudden enlargement of and tension within the adenoma may lead to alarming respiratory distress.

While it is unquestionably but a stage on the road, surgery is taking an ever more prominent place in the treatment of *exophthalmic goitre.* If, after a period of rest and medical treatment of six months' duration, improvement is transient and incomplete, it is now recognized that recourse should be had to surgery. There has been a tendency towards treatment with iodine. This should not be given for longer than three weeks at a time and at intervals of not less than three months. Continuous taking of iodine may do more harm than good and makes preparation for operation, should this be required later, difficult and unsatisfactory. The results of subtotal thyroidectomy for toxic goitre improve year by year and the mortality is well below 5 per cent. The great improvement in the surgical results in this country is due largely to the better selection and preparation of cases for operation by the physician working in close association and co-operation with the surgeon.

Thyroidectomy for heart disease.—In cases of cardiac disease with decompensation or with pain Blumgart put forward the suggestion that if the body metabolism could only be brought down to the same level as the defective heart, pain and symptoms of cardiac inadequacy might disappear. It was thought at first that a partial thyroidectomy might suffice, but after trial it was found that a total thyroidectomy was essential to obtain the desired result. Since the preliminary report from Boston by Blumgart and Berlin a great many operations on the lines laid down by them have been carried out. The immediate results in the majority of cases have been striking and, strange to say, the mortality of the operation has been low considering the type of subject on whom it is performed. The best end-results have been obtained in the cases of cardiac pain : in cases of decompensation with œdema a few very striking cases of patients who have been confined to bed for two years or more returning to active work in a few months have been reported. On the other hand in many cases the improvement has been but slight and transitory. The final place which this operation will take as a therapeutic measure is still *sub judice.*

THE SURGERY OF VASCULAR DISEASE

The limitations of sympathectomy and ganglionectomy in Raynaud's disease, Buerger's disease, and the angiospasm of advancing years are now being learned. The late results of interference with the sympathetic nerve supply have not borne out the promise of the early days. More attention has of late been turned to the value of passive vascular exercises in arterial disease and Herrmann has published a monograph on the subject. Considerable advance has taken place in the range and usefulness of arteriography.

Using thorotrast for the limbs and the head, and an iodide for injection into the aorta when visualization of the vascular network of the viscera is desired, several workers, notably Santos in Lisbon, have developed a technique which is not only safe and reliable but is likely to throw new light both on the diagnosis and the morbid anatomy of certain diseases. An example of the usefulness of arteriography is the demonstration of a limited zone of blockage of the femoral artery in a case of threatened gangrene, and the remarkable improvement which follows the excision of the diseased and occluded segment. Embolectomy has become such a generally recognized operation for embolism of an artery in a limb that only series of cases are now recorded. The advantages of prompt operation, under local anæsthesia, are beyond question. The patients are usually in poor condition and a high mortality rate is to be expected.

CHEST SURGERY

A steady advance in this, one of the newer fields of active surgery, goes on. The use of surgical measures in the treatment of pulmonary tuberculosis is now widespread, and in some countries, notably the United States of America, a large proportion of phthisis cases are subjected to some form of operation. In this country the tendency is to be more conservative, an attitude which is probably justified. In this field the surgeon should be essentially an operating physician, for in no other branch of surgery is more care needed in the judicious selection of cases, in the determination of the special type of operation for the individual patient, in the subdivision of the procedure into suitable stages, with the correct timing of each, than in dealing with the debilitated consumptive. Collapse or relaxation therapy by means of artificial pneumothorax relieves the tension in the lung and permits of effective fibrosis. Unfortunately, pleural adhesions preclude its employment in many cases. Intrapleural pneumolysis, i.e. the division of adhesions by the diathermy current, under vision through a thoracoscope, has greatly extended the range of successful collapse-therapy and has now an established place as a valuable therapeutic measure. Phrenectomy alone or combined with some other procedure is now being used with greater discrimination. In lesions of the lower lobe it is unquestionably a valuable procedure. Selective thoracoplasty is being employed with increasing frequency in many cases in which, owing to extensive adhesions, artificial pneumothorax is impossible. Lobectomy for localized bronchiectasis and for malignant tumours of the lung has met with increasing success and the use of preliminary collapse-therapy has proved a valuable help. On the other hand it must be confessed that malignant disease of the œsophagus still defies the surgeon and successful extirpation is still the rare exception, not the rule.

In the field of cardiac surgery successful experiments of grafting omentum to the ventricle to supply the circulation lost by coronary embolism or thrombosis hold out a slender promise of relief in some cases of this increasingly frequent malady.

SURGERY OF THE TESTICLE

The recent developments in knowledge of hormones has led to two interesting advances in the treatment of affections of the testicle. In *undescended testis* it has been shown that the administration of repeated doses of gonadotropic hormone, obtained from extracts of anterior pituitary or from pregnancy urine, will cause the testicles to descend into the scrotum in a large proportion of cases. Spence and Scowen have reported favourably on a series of such cases treated by twice weekly injections of pregnyl continued over a period of months. Experimental work had shown that the pituitary hormone consists of two factors, one stimulating the germ cells, the other the interstitial cells. The hormone treatment would appear to be rational —by supplying a lack of stimulus both to the descent and to the development of the testicle. Whether or not this treatment will replace operative measures, which of late years have been improved, it is yet too early to say. Possibly for certain cases hormone treatment may be adequate, whilst for others it may prove a useful adjuvant to surgical treatment. (*See* p 548)

The discovery that prolan A is present in the urine in cases of *testicular tumours*—notably seminomas—and that it disappears after extirpation of the tumour and reappears with the development of metastases has proved a valuable prognostic guide in these distressing cases. Evidence accumulates as to the remarkable radio-sensitivity both of the primary tumour and its metastases. Large masses in the lumbar glands will disappear under deep X-ray therapy, as may also extensive lung deposits. It may therefore be necessary to revise the hopeless prognosis in cases of malignant testicular tumours when rapidly growing distant metastases have appeared, and prognosis may be controlled by examination of the urine.

CONCLUSION

At no time in the history of surgery has established method been less secure. Increasing knowledge of the ductless glands and the functions of the nervous system, the possibilities of radiotherapy, and the production of passive immunity to infection are all tending to shake the dogmatic teaching and practice of former years. The surgeon requires an ever-broadening basis of education if his practice is to keep pace with the advances and assimilate the fruits of medical science. The gap between medicine and surgery is narrowing and the operating physician is coming into his own.

DISEASES OF THE ALIMENTARY CANAL

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GASTROSCOPY

GASTROSCOPY was first performed by Kussmaul in 1868 on a professional sword-swallower. Since then many attempts have been made to visualize the interior of the .stomach with instruments, but the difficulties and dangers involved were too great for the method to be of any practical value. The modern era of gastroscopy began in 1923, when Schindler, working in conjunction with Wolf, the optical instrument manufacturer, perfected a flexible instrument. By means of an ingenious arrangement of prisms and lenses a clear and undistorted view of the mucous membrane of the stomach can be obtained with the Wolf-Schindler instrument in spite of the curvature of the gastroscope. This instrument first gained popularity in Germany owing to the pioneer work of Schindler, Korbsch, Gutzeit and Henning. More recently Benedict in America, Moutier in France, and Edwards and Rodgers in this country have written on their experiences with the flexible gastroscope.

Method.—The patient is given an injection of morphine gr. ¼, hyoscine gr. 1/150 and atropine gr. 1/150, the nasopharynx is anæsthetized with 2 per cent. pantocaine, and the resting juice of the stomach is removed by means of an ordinary stomach tube, the patient having taken nothing by mouth during the preceding seven hours. The instrument is then passed with the patient lying on his left side. Distention of the stomach is achieved by gentle inflation with air. When performed in suitable cases gastroscopy is devoid of risk. The only contra-indications are fibrous stricture, simple ulcer and cancer of the œsophagus, and cancer of the stomach involving the cardiac orifice. To avoid these obvious contra-indications gastroscopy should only be employed after a routine X-ray examination of the œsophagus and stomach.

The normal stomach.—The area of the gastric mucous membrane which comes under observation is variable, being governed by anatomical considerations. In no case are the fundus and the extreme upper end of the lesser curvature visible, and in only 50 per cent. of cases is it possible to see the pylorus. Certain features constitute useful landmarks. Of these the two most important are the crescentic antral fold on the lesser curvature and the pool of mucus in the dependent portion of the greater curvature. Peristaltic waves can often be seen, particularly in the pyloric antrum. The normal mucosa is orange-red in colour. The folds are superficial or entirely absent on the lesser curvature; they are well-marked on the greater curvature and posterior wall, but less pronounced on the anterior wall. The long axis of the gastric folds corresponds with that of the stomach itself. Blood-vessels are not seen, and the lining of the stomach presents a uniform glistening appearance.

Pathological conditions.—Much—possibly too much—has been claimed for gastroscopy as an aid in diagnosis. With its limitations and advantages viewed in their true perspective there can be no doubt that the invention of the flexible gastroscope has added a useful method of gastric investigation. It is agreed by all gastroscopists that its greatest value lies in the detection and study of chronic gastritis. This is all the more true because other methods of diagnosis are so notoriously fallacious. Modern gastroscopy is doing much to ensure that chronic gastritis receives the consideration its hitherto unrecognized frequency warrants.

The types of gastritis which can be recognized by endoscopic examination can, broadly speaking, be divided into the hypertrophic and atrophic forms. The former is characterized by a deeply-coloured mucosa with thick and prominent folds. Fibrinous exudate, submucous hæmorrhages and superficial erosions may all be seen at times. Atrophic gastritis, which is most frequently seen in Addison's anæmia, presents an entirely different picture. The mucous membrane is paler than normal and the thinness of the mucosa allows the subjacent blood-vessels to become plainly visible. The folds are less pronounced and more easily obliterated by air-distention than is normally the case. These changes can be diffuse or patchy. Acute ulcers, which form part of an erosive gastritis, appear as superficial erosions, generally of insufficient depth for radiological recognition. In such cases gastroscopy is a useful means of recognizing the cause of an unexplained hæmatemesis or melæna. In the diagnosis of chronic gastric ulcer radiological technique has reached such a high stage of perfection that gastroscopy is only of value in the exceptional cases in which the diagnosis remains uncertain.

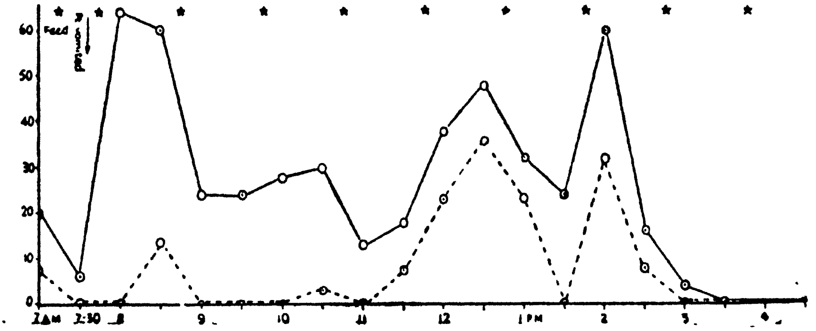
Gastroscopy is particularly useful in detecting acute and chronic gastro-jejunal ulcers, which are often difficult or impossible to recognize with the X-rays. When it is considered how difficult it is to judge even at operation, when touch as well as sight may be employed, whether a lesion is innocent or malignant, it is easy to appreciate the even greater difficulty of doing so by gastroscopic examination. Large carcinomas easily recognized by gastroscopy are usually readily detected by other methods. Nevertheless, gastroscopy may be usefully employed in doubtful cases; thus the finding of normal mucosa in an area previously under suspicion, is of particular value. Papillomas and other rare innocent tumours may at times be recognized by gastroscopy.

In conclusion it may be said that with the observance of certain precautions gastroscopy is devoid of risk. The discomfort it causes is of a minor character, and it is unusual to find a patient unwilling to subject himself to a second examination should this become necessary. In many cases gastroscopy is of real value in diagnosis, especially in the rarer forms of chronic gastritis, in the recognition of which it is the most useful single method of investigation available.

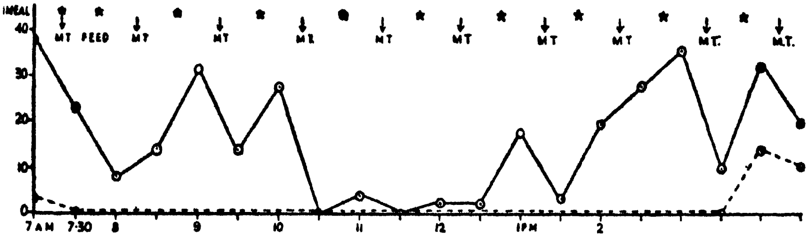
TREATMENT OF GASTRIC, DUODENAL AND ANASTOMOTIC ULCER

Alkalis and alkalosis.—Some years ago Professor Hugh Maclean recommended the use of an alkaline powder in the treatment of ulcer. There was nothing novel about the treatment, which had the disadvantage of being much too short for complete healing to occur. The manufacture of the powder by a wholesale chemist with the same surname has led to an increase in the incidence of alkalosis, as most dyspeptic patients, whether of the private or hospital class, now dose themselves with large quantities of "Maclean's powder." In common with Ryle and Hardy, I have seen patients who were thought to be dying from uræmia, but were really suffering from severe alkalosis, and were saved by discontinuing the use of alkalis and by giving ammonium chloride by rectum. So prevalent is this condition that the possibility of alkali poisoning should be remembered whenever a patient who was not hitherto known to be suffering from renal disease develops uræmic symptoms with high blood urea. I believe that more deaths must result from unrecognized poisoning with alkaline powders than from accidental poisoning with the barbiturates.

Magnesium trisilicate.—Mild symptoms of alkalosis are common in patients receiving the usual ulcer treatment. General irritability and complaints of headache, distaste for food and nausea are more often caused by alkalosis than boredom with the diet; they disappear dramatically on discontinuing the alkalis. The introduction of a drug which reduces gastric acidity without causing alkalosis is consequently welcome. Mutch has shown that magnesium trisilicate *adsorbs* hydrochloric acid without acting as an alkali. It can therefore be given in large doses without causing alkalosis. For some months I have given this preparation in thirty-grain doses to ulcer patients in place of the usual alkalies with the exception of sodium citrate added to the milk feeds. Alkalosis has never developed and the bowels are kept regular by the slight aperient action of the salt. Hourly sampling of the gastric contents during its administration shows that it prevents the appearance of free hydrochloric acid in the stomach (Fig. 1.)



(*a*) ***With no drugs***; free acid present in 9 out of 20 samples, twice in considerable quantity.



(*b*) *With* 1 *dr. magnesium trisilicate* ($\overset{\downarrow}{\text{M.T.}}$) *between feeds* (*); free acid present in only 3 samples.

FIG. 1.—Ten-hour test meals with 5-oz. hourly milk feeds (*) in a patient with gastric ulcer. (Dr. W. N. Mann.)

Histidine.—Histidine, known also under the trade-names of larostidin and stellidin, has recently gained much popularity as a treatment of ulcer. It was introduced as a result of a fantastic theory which is quite untenable, but there is no doubt that in many cases it relieves the pain of ulcer. It probably acts in the same way as the protein injections which have for several years been the routine treatment in a certain German clinic. The protein injections were long ago discarded by German gastro-enterologists, who found that in spite of relieving pain they did not hasten the healing of the ulcer. As pain is almost invariably relieved within a few days of beginning a proper dietetic treatment, histidine can have no place in the treatment of ulcer unless it can be proved to do something more than this. Sandweiss has described some control experiments in the treatment of ulcer with daily injections of 5 c.cm. distilled water. Of twenty patients treated the results compared favourably with those obtained with histidine injections, as twelve, or 60 per cent., became symptom free—five of them after the first injection and three after the second—compared with 55 per cent. of the forty patients treated with histidine. He adds that of the twenty-four patients in whom the symptomatic improvement was checked by either X-ray examination or operation after histidine treatment, not one showed complete disappearance of the ulcer, and 85 per cent. of the patients who had remissions with histidine returned with ulcer symptoms within six months. Flood and Mullins found that eight out of twelve patients with duodenal ulcer obtained prompt relief from pain as a result of having daily injections of normal saline solution for three weeks, and several testified that they had not felt so well for many years. Four out of six patients obtained similar relief from injections of larostidin; one of the two who had no relief subsequently died of hæmorrhage. During the last two years there has been no diminution in the number or severity of ulcer cases coming to New Lodge Clinic, although almost without exception they have received one or more courses of histidine injections. In several cases a hæmorrhage, sometimes the first the patient had ever had, occurred while the injections were being given or shortly afterwards.

Cosin has observed the case of a young man who was sent to the out-patient department at Guy's Hospital soon after having had a hæmatemesis. An X-ray examination showed no sign of an ulcer (Fig. 2). He was given 24 injections of larostidin but no other treatment. He was then X-rayed again and one of the largest gastric ulcers ever seen at the Hospital was discovered (Fig. 3). Gastrectomy was performed, as a rapidly developing carcinoma was suspected, but a simple spreading ulcer was found.

In addition to ulcer cases, patients with carcinoma of the œsophagus and stomach have been given this treatment before coming to the Clinic, and their recognition and proper treatment have been seriously delayed. Although there is no doubt that histidine sometimes hastens the healing of an ulcer, especially one of recent origin, I have never seen the slightest benefit result from its use when I have tried it in cases, mostly of anastomotic ulcer, in which improvement was slow with the usual treatment. There can be no doubt that the Council of the American Medical Association was fully justified when it recently declared histidine " not acceptable for New and Non-Official Remedies because it is marketed with unwarranted therapeutic claims." There can be no great objection to the use of histidine *in addition to* the usual treatment by rest and dieting, although I believe it is quite superfluous. But its use as a substitute for the proper treatment is quite unjustifiable, as although an occasional patient may be saved trouble in this way, the majority will be placed in a fool's paradise, in which the ulcer, though temporarily latent, becomes progressively less amenable to treatment.

Jejunal and gastric feeding by tube.—For twenty-five years Einhorn of New York has treated cases of ulcer by feeding through a tube introduced into the jejunum. The method has gained no widespread popularity in America, but during the last few years it

FIG. 2.—Skiagram of stomach on September 23rd, 1935, showing no ulcer crater.

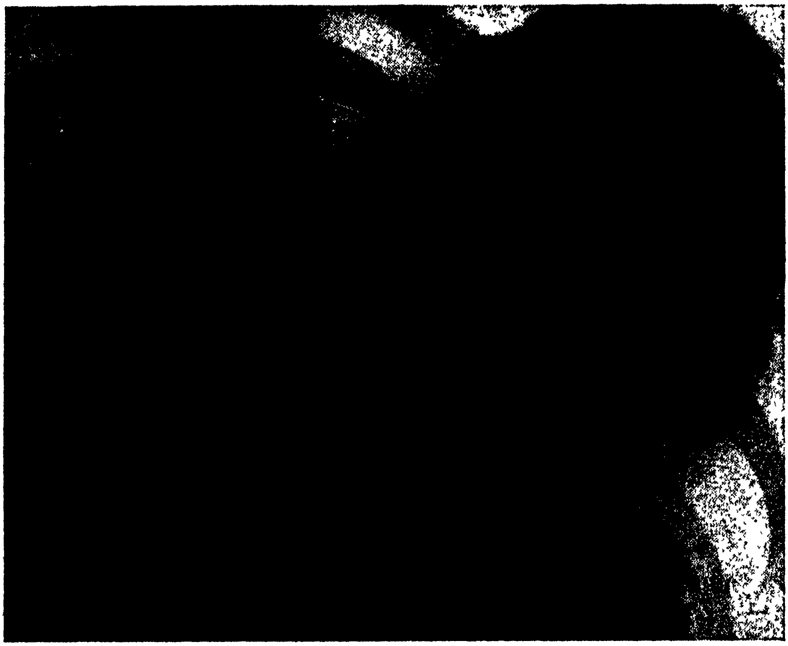
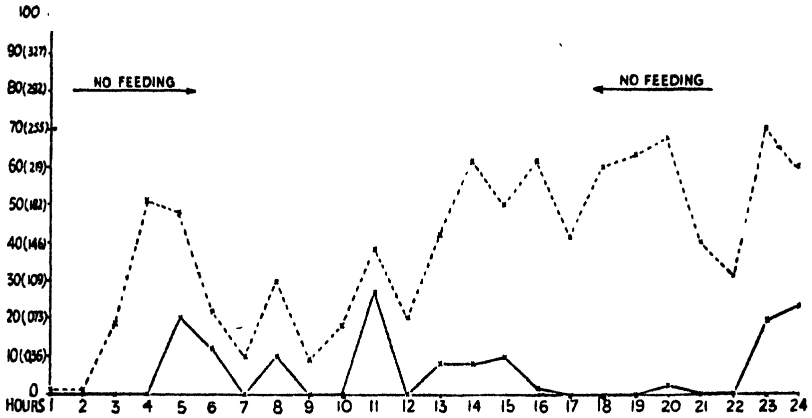


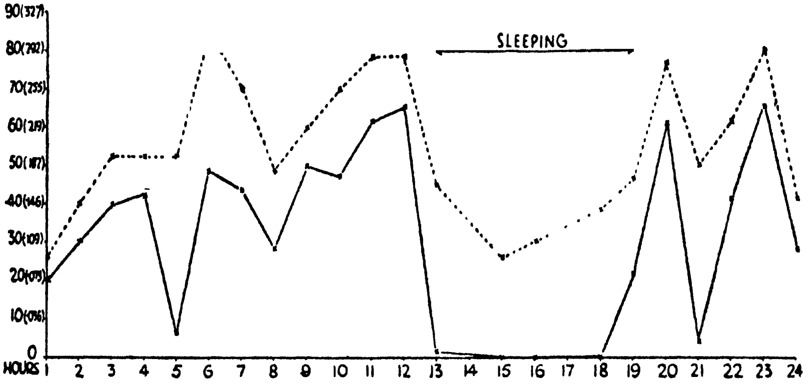
FIG. 3.—Skiagram of stomach on November 28th, 1935, just after receiving 24 injections of histidine. Enormous ulcer crater on lesser curvature.

has found a number of advocates in England, especially Ernest Young and more recently Bourne and Maile. Winkelstein of New York, impressed by the deleterious action of the continuous secretion of acid gastric juice throughout the night in patients with duodenal ulcer, has advocated continuous feeding with milk by the drip method through a tube introduced into the stomach. My house-physician, Mr. R. M. Kark, and ward-clerk, Mr. J. J. Davis, have compared these two diametrically opposed treatments in the same patient by examining samples of gastric contents obtained through a separate Ryle tube in the stomach at hourly intervals though the day and night. They found that when food is introduced into the jejunum there is a continuous secretion of acid juice into the stomach, whereas by Winkelstein's method complete achlorhydria is present throughout the day and night. (Fig. 4.) There seems therefore no advantage in Einhorn's method to compensate for its unpleasantness, but continuous feeding through a tube during the night in patients with duodenal ulcer or anastomotic ulcer who do not respond to ordinary treatment is well worthy of a trial.

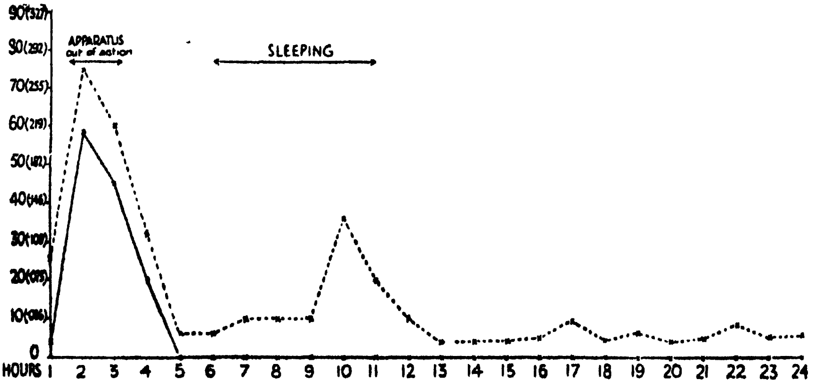
Gastrectomy.—It required twenty years for the shortcomings of gastro-enterostomy to become recognized. To-day most of the younger surgeons in England as well as on the Continent and in America perform the more radical operation of partial gastrectomy instead of gastro-jejunostomy, not only for gastric and anastomotic ulcers but also for duodenal ulcer. For a short time I believed that this change of practice was justified, as it was said that the operation gave rise to complete achlorhydria, which would make the development of a new ulcer impossible, although the segment of the stomach left after partial gastrectomy is that which secretes hydrochloric acid and pepsin. Unfortunately it is now becoming clear that although achlorhydria generally



(*a*) 5 oz. milk given hourly by mouth (except for periods indicated).



(*b*) 5 oz. milk given hourly as a continuous drip through a tube in the stomach.



(*c*) 5 oz. milk given hourly as a continuous drip through a tube into the jejunum.

FIG. 4.—Twenty-four hour test meal taken during continuous jejunal feeding (Einhorn) and gastric feeding (Winklestein) compared with hourly feeds by mouth.

follows gastrectomy for gastric ulcer (five out of five of my cases), free acid is still secreted, often in great excess, in about 50 per cent. of cases in which the operation is performed for duodenal and anastomotic ulcer (five out of eleven of my cases). As a corollary of this, recent observations show that a new ulcer forms quite frequently after gastrectomy in such cases. Out of the thirteen private patients on whom I have had a partial gastrectomy performed for an anastomotic ulcer during the last seven years, two died from the operation, one developed a new ulcer immediately after the operation and died after a further portion of stomach was removed a month later, medical treatment having failed to give him any relief, and another patient, a young man of 23, died from hæmatemesis without premonitory symptoms two years after gastrectomy for a chronic duodenal ulcer. Exactly one quarter of the survivors from partial gastrectomy for duodenal or anastomotic ulcer are now suffering from a recurrence of symptoms. During the same period I have had one patient with a large anastomotic ulcer and three with severe recurrent hæmorrhage following partial gastrectomy performed elsewhere, the first for a gastric ulcer. Morley, Brooke and Little have recently (1936) described a fatal case of gastro-jejuno-colic fistula with perforation into the general peritoneal cavity in a man of 41, following partial gastrectomy in 1930 for a recurrent duodenal ulcer, for which a gastro-jejunostomy was performed in 1927. In view of these unsatisfactory results of gastrectomy I am now convinced that gastro-jejunostomy is the best operation for the exceptional cases of duodenal ulcer in which prolonged medical treatment fails, and that anastomotic ulcers should be excised and the parts restored to their original anatomy unless pyloric or duodenal obstruction is present, when partial gastrectomy must be performed in spite of its dangers. Whatever operation is performed, the patient must of course follow a careful post-ulcer regime for the rest of his life. If a recurrence occurs it is generally much easier to cure the duodenal ulcer by medical treatment than an anastomotic ulcer. On the other hand, few conditions are more intractable than an anastomotic ulcer which has followed partial gastrectomy, as further surgery is either impossible or very difficult, and the response to medical treatment is often unsatisfactory.

REGIONAL ILEITIS (CROHN'S DISEASE)

In 1932 Crohn of New York drew attention to a not uncommon intestinal disease, which had hitherto escaped recognition. Individual cases have been recorded in the past, generally as hyperplastic tuberculosis, but to Crohn must be ascribed the credit of first describing the clinical picture of this important disease and of demonstrating that it has nothing to do with tuberculosis.

Numerous papers have appeared in America on the subject (E. G. Rosenblate, Goldsmith and Strauss; Koster, Kasman and Sheinfold), but the condition is only just becoming recognized in England. Cases have recently been recorded by Dickson Wright, Harold Edwards and Barbour and Stokes, and a beautiful coloured illustration of terminal ileitis was published by Jackman in 1934 as a hitherto undescribed disease. I have seen two typical cases, which are described by Lintott in the *Guy's Hospital Reports* for October. A good account has been published by Snapper, Pompen and Groen in Holland, but Crohn's disease remains unrecognized in other parts of the Continent.

Morbid anatomy.—The terminal part of the ileum is generally first involved. The disease may spread into the cæcum, and any part of the small intestine and colon may be attacked. The mucous membrane is inflamed and eventually ulcerates, and all the coats of the affected segment become thick, œdematous and rigid. Active inflammation is followed by fibrosis, and the lumen of the rigid bowel becomes progressively more narrowed. The mesentery is thickened and the lymphatic glands are enlarged. Adjacent parts of the bowel adhere together, and fistulæ form between them and occasionally open on the surface of the abdomen. Microscopically acute, subacute and chronic inflammation are found with giant cells, so that the appearance closely simulates tuberculosis, with which it has generally been confused in the past. But tubercle bacilli are never present in the wall or lumen of the bowel, and animals inoculated with the tissue never develop tuberculosis. The condition is probably infective, but nothing is known as to the nature of the infection.

Symptoms.—The symptoms are those of progressive obstruction of the small intestinal. The patient complains of attacks of pain of gradually increasing severity round the umbilicus and in the right lower quadrant of the abdomen, the whole of which is distended with gas. The attacks may be associated with watery diarrhœa and occasional vomiting, but constipation is often present in the intervals. The stools always contain occult blood; when they are loose, shreds of mucus are seen. The affected segment of the ileum may form a sausage-shaped tumour, which can be felt in the right iliac fossa. Mild pyrexia and slight polymorphonuclear leucocytosis are often present. After a time anorexia develops and the patient loses weight and becomes anæmic. An X-ray examination should be made hourly from three to six hours after an opaque meal. In addition to the evidence of small-intestine obstruction afforded by the presence of loops of dilated bowel containing fluid and gas, filling defects in the terminal ileum and sometimes in the cæcum may be seen. Most characteristic is the "string sign"—a thin, irregular, linear shadow passing from dilated coils of ileum through the filling defect to the cæcum. A better view of the terminal ileum is sometimes obtained after a barium enema, which runs through the incompetent ileo-cæcal sphincter (*See* also p. 427).

Diagnosis.—Pain in the right lower quadrant of the abdomen associated with distension, local tenderness, possibly a tumour, and pyrexia should always raise a suspicion of regional ileitis in addition to subacute appendicitis, ileo-cæcal tuberculosis, carcinoma of the ileum and, when fistulæ are present, actinomycosis.

Treatment.—The affected segment of bowel should be excised. Simple short-circuiting is generally insufficient, as the disease tends to spread in both directions if it is not eradicated. Short-circuiting is, however, required when the infiltration of the mesentery is so extensive that excision is dangerous and as a preliminary operation when fistulæ are present.

I am indebted to Dr. G. A. M. Lintott, Medical Registrar, Guy's Hospital, for the note on gastroscopy.

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ACUTE ABDOMINAL DISEASE

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A PERUSAL of the medical literature of the past year shows that the accurate diagnosis of acute abdominal disease is still one of the most interesting problems in clinical work. The picture is seldom typical, so many diseases may cause similar symptoms and one disease may present itself in so many guises that even the experienced surgeon may find it difficult to make a correct diagnosis.

ABDOMINAL PAIN IN THE EXANTHEMAS

Among the numerous diagnostic pitfalls which are enumerated by Finney two or three merit special mention, particularly abdominal pain at the onset of the specific fevers and during the process of coronary occlusion. Finney relates a case of measles which began with nausea, vomiting, general abdominal tenderness, moderate leucocytosis, and a temperature of 102° F. Appendicitis was suspected, but later a typical measles rash came out and the abdominal symptoms subsided.

The whole question of the occurrence of appendicular symptoms in acute infectious diseases has very recently been discussed by Ronaldson. It is certainly rather rare for severe appendicitis to occur in the course of

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THE RIGHT HON. LORD MOYNIHAN OF LEEDS, K.C.M.G., C.B., M.S.

Since this article was in print, the shadow of a great loss—the sudden death of Lord Moynihan—has darkened the world of surgery. The greatest surgical figure of his generation, more especially a great pioneer of abdominal surgery, he greatly advanced the science and nobly upheld the dignity of his profession.

scarlet fever. Ronaldson states that, at one fever hospital, only two cases were operated on for appendicitis in five years, whilst at another there was one appendicectomy in 7,659 cases of fever. I have operated for perforative appendicitis occurring during the convalescence of scarlet fever on several occasions. In view of the facts that the throat is always affected in scarlet fever and that it is recorded (by Kauffmann) that the lymphoid tissue of the appendix is frequently involved in the general inflammatory reaction to the disease, it is strange that more serious attacks of appendicitis seldom occur. The comment has indeed been made that the appendix "seems to enjoy a high degree of immunity from the septic manifestations of scarlet fever." The appendicular symptoms which may occur at the onset of an attack of measles are probably due to a true mild inflammation of the appendix. Ronaldson mentions the interesting fact that Schultze actually diagnosed a case of measles by comparing a microscopic section of an appendix (removed by operation) with the illustrations in an article by Finkeldey which gave the exact histological appearances of the appendix in cases of measles. It would thus appear that a characteristic inflammatory reaction takes place in the appendix in measles. Evidently in doubtful cases of appendicitis in children it will be wise to examine the buccal mucosa for Koplik's spots.

ABDOMINAL PAIN IN HEART DISEASE

True angina pectoris may be accompanied by severe epigastric pain, and severe pain of abdominal origin may give rise to symptoms indistinguishable from true angina pectoris. Finney recounts one case of angina which was cured by the removal of a stone from the common bile duct; and he describes another case in which a patient who suffered from severe dyspnœa, palpitations and cardiac oppression lost all these symptoms following an operation for removal of gall stones. The simulation of acute abdominal disease by coronary thrombosis may be very close. Finney states that by taking into account the age and sex of the patient, obtaining a detailed history and scrutinizing the symptoms closely differentiation should be possible. He points out that the pain of coronary occlusion may be absolutely localized in the gallbladder region, more rarely in the right lower quadrant, but more frequently in the mid-epigastrium. In such cases Zierold advocates the diagnostic administration of morphine which will usually cause relaxation of any abdominal rigidity of cardiac origin but not of the rigidity due to intra-abdominal disease. He explains his views as follows :—

> " In the severe attacks (of coronary disease) excessive pain stimulus frequently results in a protective spasm of the abdominal musculature similar to that evoked by abdominal disease. This is, of course, cortical in origin and is the uncontrollable response to pain. It would appear that the administration of morphine in acute abdominal disease should not only abolish the general abdominal spasm and rigidity due to cortical interference but should tend to define more sharply the localized abdominal spasm from the affected viscus."

Zierold tried this morphine test in 150 cases and found that it failed to confirm the final (correct) diagnosis in only sixteen cases. With thoracic disease, perforating ulcer and pancreatitis no errors occurred, but the test was unsatisfactory in cases of intestinal obstruction. With coronary thrombosis the blood pressure may suddenly drop but may soon return to normal. Finney, indeed, states that " the doctrine that coronary occlusion is always accompanied by an immediate drop in blood pressure is far from true," yet in general the rule holds good.

A recent case under my observation may serve to show the difficulties in diagnosis of these cases.

A man aged 46 was taken ill with acute central epigastric pain at 7 p.m. on December 29, 1935. He sweated and fainted and went to bed. When seen by his doctor he was collapsed and had a systolic blood-pressure of 90 mm. Hg. There was no fever and the pulse was 60. He was given morphine, but the pain persisted. During the same day his pulse rate increased, fever developed, and the abdomen became rather rigid. His respirations became rapid and crepitations were heard at both bases. The abdomen was somewhat distended but the liver dullness was normal. Extreme tenderness in the mid-epigastrium and some muscular resistance appeared when he lay back but not when he bent forward. He sat up easily but turned over with obvious discomfort. There was no tenderness per rectum. The blood pressure rose to 130/90 mm. Hg.

It was decided that the condition was thoracic in origin. Within a few days a pericardial rub was detected giving the diagnosis of coronary occlusion. Two weeks later, when he seemed to be on the road to recovery, he died suddenly.

The differential diagnosis of these cases is of extreme importance since operative interference in a case of coronary occlusion is likely to be fatal. It is possible that in some cases the abdominal symptoms may be due to a coincident mesenteric vascular occlusion.

MESENTERIC VASCULAR OCCLUSION

There has been considerable discussion during the past year on this question. When the blood supply of a portion of intestine is diminished or altogether cut off by a thrombus in the main artery or vein the symptoms which ensue vary according to the extent of the lesion. It is possible and likely that minor degrees account for a number of those cases of abdominal pain, distension and vomiting which get well without the need of operation in elderly people. In severe cases operation is frequently called for, though a correct pre-operative diagnosis is difficult and rarely made. Douglas emphasizes three diagnostic points. First, a previous history of thrombus or a source of embolism; secondly, acute abdominal pain accompanied by a high leucocyte count; and, thirdly, an early subnormal temperature with abdominal rigidity and melæna. Sneierson is rather pessimistic over the diagnosis of these cases. He states :

"The diagnosis of mesenteric thrombosis is rarely made ; a diagnosis of intestinal obstruction would seem to be sufficient for practical purposes."

Yet he mentions a circumstance of great value in diagnosis when he remarks that:

> "The symptom-complex of pain out of proportion to the objective signs, fever and leucocytosis, have been demonstrated in vascular occlusion."

The important point is not the fever, which is inconstant, but the severe pain without adequate signs to account for it. I have met with striking evidence of this.

A patient was seen in the early stage of an extensive mesenteric thrombosis who suffered the utmost agony of abdominal pain while presenting a lax undistended abdomen with no abnormal physical signs. Only after twenty-four hours did distension ensue.

It is possible that the early severe pain may be a true vascular angina which is followed by the other symptoms as the intestinal circulation is interfered with. The symptom of melæna or the passage of blood per rectum is sometimes evidence of mesenteric thrombosis. In this connection one should bear in mind Cokkinis's observation that in some cases the giving of an enema may demonstrate blood in the lower bowel.

ILEO-CÆCAL PROBLEMS

Various pathological lesions in the ileo-cæcal region may simulate the symptoms of acute appendicitis. Kleiber has recently called attention to the symptoms caused by infection of the ileo-cæcal lymph-glands. The frequency with which tuberculous ileo-cæcal glands simulate appendicitis is well known, but Kleiber states that non-tuberculous mesenteric lymphangitis may cause acute symptoms. The infection is stated to come most often from infected tonsils and to travel via the blood stream or the intestinal lumen to the lymphatics of the mesentery. The glands become swollen, frequently a serious exudate occurs, but in most cases the condition subsides without suppuration.

The symptoms caused by this mesenteric lymphangitis are intestinal colic, fever and leucocytosis, together with some local tenderness in the right iliac region. Every surgeon of experience must have met with such cases, but in the absence of a microscopical examination it would always be very difficult to differentiate between the early stage of tuberculous adenitis and the non-tuberculous condition. It is quite common to find an enlargement of the ileo-cæcal glands with a true appendicitis, but the glandular enlargement should subside after appendicectomy. In true mesenteric lymphangitis the chief changes are in the lymph system and mesenteric glands, and recurrence is frequent even after removal of the appendix.

About five years ago Crohn described a condition of chronic hyperplastic inflammation of the lower ileum which gave rise to fairly characteristic subacute symptoms. During the past year there have been several publications dealing with an acute condition of the lower ileum, possibly an earlier stage of the chronic lesion, and giving rise to acute abdominal manifestations. Under the title of "acute regional ileitis," Probstein and Gruenfeld describe a hyperplastic non-specific inflammation of the lowermost segment of the ileum giving rise to acute clinical symptoms. Pain, vomiting, and the presence of a lump in the right lower abdomen would easily lead to a diagnosis of appendicitis. The authors mistook one such case for intussusception. The condition leads to intestinal obstruction and in two of the three cases recorded enterostomy was performed.

A somewhat similar condition is described by Erb and Farmer. They recount four cases of acute inflammation of the lower ileum and adjacent parts of the cæcum and ascending colon, and give their opinion that the pathological condition may represent the acute phase of regional ileitis or chronic cicatrizing enteritis. It must be pointed out, however, that regional ileitis does not as a rule affect the adjacent cæcum. Clinically, the cases simulate acute appendicitis and the authors state that there were no differentiating points either in the history, physical examination, or the laboratory findings. (*See* also p. 420.)

ABDOMINAL SYMPTOMS IN DIABETES MELLITUS

The abdominal symptoms which may accompany diabetes have recently attracted more attention. It is well known that nausea and vomiting may occur in the course of diabetes but it is not so well recognized that abdominal pain, tenderness, and even muscular rigidity may accompany these symptoms. Some fever and a leucocytosis may complete the picture of an acute abdominal inflammation. J. Beardwood (junr.) analysed the symptoms of 1,000 cases of diabetes and found that 114 showed some acidosis: 81 of these 114 presented one or more abdominal symptoms and fourteen were actually sent into hospital with a surgical diagnosis of either cholecystitis, appendicitis, peritonitis, or pancreatitis. The symptoms subsided under appropriate treatment for the diabetes. It is interesting to note that of those cases of diabetes sent into hospital actually suffering from an acute abdominal inflammatory lesion not one gave evidence of acidosis. The reason why abdominal symptoms should develop in diabetes is not understood, though the theories have been advanced that it is either due to pancreatitis, or to an intense spasm of the intestinal tract, or (in the case of vomiting) a defence mechanism to get rid of the acid ions in the gastric juice. To avoid serious mistakes, it is necessary first to test the urine for sugar, secondly to determine whether acidosis is present, and thirdly to take the requisite measures to diminish any acidosis. If the abdominal symptoms persist even after the acidosis has been adequately treated then one must recognize that a true abdominal lesion is probably present, and suitable treatment (either operative or otherwise) be given.

CLINICAL AND X-RAY SIGNS

There have been no striking recent advances in the clinical methods of diagnosis of acute abdominal disease. It is true that Kimio Numata has shown that the severity of peritoneal infections may be estimated from the blood-sugar curve after intravenous injection of glucose. In severe infections the return to normal is more gradual. It is doubtful, however, if this test will be of much practical value. Much more important are the advances made in the radiological methods of diagnosis. Many surgeons (including the writer) were for some years inclined to consider X-rays as out of place in diagnosis of acute abdominal disease, but experience has shown that in some doubtful acute cases and in many subacute cases, the radiologist can be of great help. Though H. A. Singer goes much too far in asserting that "few surgeons possess the ability and patience to obtain a careful history, to make a thorough physical examination, and properly to analyse and evaluate the individual diagnostic features," yet it is possible to agree with him that "no one can afford to omit rœntgenology entirely, for it furnishes at times information which cannot be obtained by any other means."

Though radiography may be a great help it should never displace or cause any lack of care in the usual clinical examination. There are three groups of cases in which the X-rays can be of special use. First, in distinguishing between thoracic and abdominal disease. Everyone knows that acute pleurisy may simulate acute peritonitis. Singer points out that early acute pleurisy may be recognized by the lag of the diaphragm on the affected side and the cloudiness of the costo-phrenic angle due to the presence of exudate. He asserts also that in coronary thrombosis the appearance of the heart as seen by X-rays may clinch the diagnosis. Secondly, X-rays may be of great assistance in cases of intestinal obstruction. A plain X-ray of the abdomen in cases of obstruction of the large bowel will show the dilated coils of large intestine and frequently indicate where the obstruction is situated by the sudden termination of the distended part. The use of barium is not usually advisable in acute cases. Coils of small intestine as a rule do not show up in the X-ray of a normal abdomen. If there is small-gut obstruction an X-ray picture will show the dilated coils of intestine, and in many cases the fluid levels of the liquid pools of stagnating intestinal contents can also be seen. Such fluid levels are never found in unobstructed gut. In the event of a suspected but doubtful case of intussusception a barium enema may be given and the presence or absence of an invagination clearly demonstrated by X-rays. Such an enema also helps to reduce any intussusception which may be present. Thirdly, although Singer's dictum that " the X-ray finds its greatest field of usefulness in the diagnosis of perforated peptic ulcer " cannot be confirmed, there is no doubt that in doubtful and subacute cases radiology may help towards a definite decision. Diagnosis is made by observing free gas between the liver and the diaphragm. This gas, which has escaped from the stomach or duodenum, is found in 70 per cent. of cases. It is absorbed slowly and may be found a number of days after perforation.

Todd also points out the value of X-rays in cases of abdominal injury when it is doubtful whether the intestine has been injured. The patient is examined in a sitting position and Todd remarks, " Even a few c.cm. can be seen with striking clearness between the liver and the diaphragm." Holubec has related a case in which he was able to clinch the diagnosis of a volvulus of the cæcum by means of X-rays.

The general objections may be made against the use of X-rays in acute abdominal disease that in clinical work of this nature X-rays are not readily available and the patient is usually too ill to submit to the special examination of radiography. Nowadays, however, the great majority of acute cases are dealt with in hospitals and for other cases portable X-ray outfits are often available. Regarding the second objection, though the dictum that " any patient who is too ill to be fluoroscoped is too ill to be adequately examined physically and far too ill to withstand laparotomy " is not acceptable, yet it is believed that in those cases in which radiography can be of assistance it is seldom that the patient is too ill to undergo the extra examination.

CARCINOMATOSIS

Every surgeon has from time to time opened an abdomen presenting acute symptoms, only to find to his dismay that there is general abdominal carcinomatosis. P. Bernstein has recently emphasized the fact that ovarian carcinomas may simulate acute abdominal disease. Among 64 cases of ovarian growths which he collated four presented acute symptoms—pain, nausea, vomiting, chills, fever, abdominal rigidity, leucocytosis, and a rapid sedimentation-time. These four cases were diagnosed as suppurative appendicitis, pelvic abscess, intestinal obstruction, and twisted ovarian cyst. Bernstein points out that the symptoms were due to secondary changes resulting from the tumour—infection, adhesions and metastases.

TREATMENT

The question as to the best method of treatment of a *perforated peptic ulcer* continues to find varying answers. The great majority of surgeons still find it sufficient to close the perforation by suture and then oversew with omentum. A simultaneous gastro-jejunostomy is now only occasionally performed. When the patient is profoundly shocked it is best to wait half an hour or an hour while rectal or intravenous glucose-saline is administered to improve the condition of the patient. Few will agree with E. C. Brenner's advice that "the treatment of acute perforation is immediate operation regardless of any degree of shock that be present, as the patient's condition rapidly improves with the relief of intraperitoneal tension." This is a dangerous doctrine to preach, for I have known several deaths ensuing immediately after operation upon cases of perforated ulcer in which the initial shock had not been recovered from at the time of operation. If there is no evidence of shock, certainly operate immediately, but if shock be present it must be combated first. The satisfactory results of simple suture are shown by Brenner's follow up of eighteen cases. Fourteen remained well, one required gastro-jejunostomy two years later and three still suffered from digestive upsets.

The fact that many of the ulcers which perforate are chronic ulcers has led some to recommend more drastic operative measures. Kœnnecke is in favour of resection of a perforated ulcer if possible. His published operative results would support his contention, for of 41 perforated ulcers operated on by him resection was performed in 32 cases and only two patients died. Of nine cases in which the ulcer was simply sutured five died. It is quite clear from the written account that only the worst cases would be treated by simple suture and such favourable figures for partial gastrectomy in patients so acutely ill must be regarded as exceptional. Perforated ulcers situated in the second part of the duodenum or the cardiac end of the lesser curve would always be unsuitable for resection, and cases coming late for operation would seldom be well enough to stand the operation. Moreover, a considerable number of perforated acute ulcers certainly do not call for gastric resection. Gastric resection in the case of a perforated ulcer must therefore be rarely needed, and if carried out by any but skilled surgeons would lead to much worse results than are at present attained. This view is supported by Kœnnecke's own statement that

> "It is impossible to dogmatize as to when suture or resection should be done. Resection needs skill and speed. If a surgeon does not possess these it is a mistake to resect an ulcer which has perforated."

Some years ago when intravenous ether was advocated as a method of anæsthesia, it was recommended for those patients with perforated ulcer suffering severely from shock and dehydration. For a similar class of case Hamilton Bailey has recently recommended the use of evipan given intravenously. A needle is introduced into a vein and saline is allowed to flow in gradually. The abdomen is opened under local anæsthesia and before the necessary intra-abdominal manipulation is started the requisite dose of evipan (in solution) is allowed to enter the vein along with the saline. This should be a useful method in appropriate cases.

One of the most dreaded complications of a perforated ulcer used to be a subphrenic abscess. Since the adoption of the Fowler position in after-treatment, subphrenic abscess is less common but still occasionally causes trouble. The most frequent position for this is in the space between the right lobe of the liver and the diaphragm. Fluid easily collects in this space and cannot easily find its way out. It is my belief (and I do not ever remember seeing the point remarked upon previously) that the fluid which becomes the subphrenic abscess is left behind at the time of operation and merely serves as a culture-medium for septic organisms present at first only in small numbers but soon multiplying until thick pus results from the reaction. If the subphrenic space is properly emptied a subphrenic abscess should not develop. It is difficult to reach the posterior part of the subphrenic space; but by means of a long curved metal tube attached to a suction apparatus the whole space may be well cleared. The subhepatic space must also be emptied of fluid. Failing a suction apparatus, swabs on long holders may be passed into the space but this method is not so efficient. A suction apparatus ought to be available in every operating theatre.

The treatment of those cases of *appendicitis* which come under observation more than two days after the onset of symptoms still gives rise to difference of opinion. Almost equally good statistics have been published by those who make a rule of operating as soon as the diagnosis has been made at any stage of the disease and by those who treat conservatively after two days of the disease have elapsed before the case is seen. It is indeed very difficult to obtain absolutely comparable series of figures, and time is but an uncertain measure of the progress of the appendicular disease. At a discussion which took place before the Medical Society of London early this year the majority of speakers held the view that operation as soon as convenient after the diagnosis has been made is the preferable treatment, provided that the operative procedure adopted is one adapted to the particular stage that the pathological condition may have reached. The opener of the discussion pointed out that Ochsner's conservative method of treatment was seldom carried out strictly according to the technique advised by the originator of the method. When this method was conscientiously followed the results were very good, but greater judgment, skill and care were probably needed to obtain success than by the less conservative method. He summed up what he considered the general opinion of most experienced surgeons by quoting Ochsner (junior) who wrote as follows :—

> " We wish merely to emphasize that the conservative treatment is not a medical treatment, but is surgical in every sense of the word. It is one that is extremely difficult to employ properly, and one which requires a great deal more surgical judgment than the so-called radical therapy. It is our opinion that for the occasional operator, one who does not frequently treat patients with peritonitis and varying types of appendicitis, it is probably better to remove the appendix when the patient is first seen."

Though it will probably be generally conceded that an occasional case will be lost by unnecessary interference, and might have recovered under conservative treatment, this is more than balanced by the cases which would be lost by the injudicious application of the " delayed " method of treatment. It would be a retrograde step if it were generally accepted that delay, even attended with every precaution, is the correct treatment for those cases of appendicitis seen after the forty-eight hour limit. There must be excepted from this statement, and most surgeons will agree with the exception, those cases in which the patient is extremely toxic as the result of an extensive peritonitis. When a patient presents an appearance approaching the Hippocratic facies, when the abdomen is distended, the body dehydrated, and the blood pressure lowered, then immediate operation is more likely to precipitate a fatal result. For these cases conservative treatment offers the better chance of success. Rectal or intravenous glucose-saline solution, the emptying of the stomach by the duodenal tube, the entire stoppage of fluid by the mouth until vomiting has ceased and the abdominal symptoms begin to subside, and the refusal to give aperient drugs, may tide the patient over the crisis until drainage can be undertaken. If the method of immediate operation for most cases be accepted it is nevertheless imperative that the operator should do as little as possible to disturb the inflamed parts, that he should not remove the appendix if he thinks the protective adhesions will be dangerously disturbed thereby, and that he be content merely to institute drainage in those cases of abscess which are strictly localized. As much judgment is needed in operating as in knowing when to operate.

The treatment of *paralytic ileus* accompanying the peritonitis due to perforation of the appendix was the subject of an address by Sampson Handley last November. He dealt with those cases in which the usual methods had failed. For these severe cases, in which the lower ileum and the lower colon were usually both involved, he re-affirmed his belief that the best treatment was the performance of an ileo-colostomy (or jejuno-colostomy) and a cæcostomy. He regarded enterostomy as inefficient for the serious cases though undoubtedly life-saving in some of the less severe types of ileus. Though incidental to his main thesis, one of the most interesting parts of Handley's address was the description of an occasional late sequel of an anastomosis between the jejunum and the colon—i.e. pernicious anæmia. Two of his small series of cases developed pernicious anæmia eight years later. One died from the disease but the other recovered after the anastomosis was undone and the alimentary canal restored to normal. This late complication is certainly a serious drawback to the operation. An earlier knowledge of its occurrence might have saved one of my patients on whom I performed jejuno-colostomy for severe paralysis of the intestines following appendicular peritonitis. Two or three years later the patient developed pernicious anæmia which was greatly benefited by liver therapy, but a fatal result ensued within a year or two on account of renal complications.

It is well known that there is sometimes difficulty in the diagnosis between appendicular peritonitis and *pneumococcal peritonitis* in children. Many do not favour operative intervention in the early stage of pneumococcal peritonitis, but operation is imperative in appendicitis. For such doubtful cases Hudacsek recommends that a very small incision should be made on the right side of the abdomen under local anæsthesia. This will make the diagnosis certain and do no harm.

The mortality from *intestinal obstruction* still remains much too high. No great advance in technique has to be recorded though a valuable addition to our clinical knowledge of intussusception has been furnished by Elliot Smith. Dealing with cases of irreducible intussusception in young infants Elliot Smith showed that there is a good chance of recovery if a simple short-circuit of the affected part of the intestine is carried out. The mortality of resection of the intussusception in young infants is very high and it is hopeful to find a method which offers a better chance of recovery.

The two ways in which improvement in results of treatment of intestinal obstruction may be brought about are by earlier diagnosis of the condition and a better understanding of the pathological causes which lead to death. During the past year or two several valuable additions to our knowledge of the pathology of intestinal strangulation have been made by Holt, Aird, Knight, Slome, van Beuren and Gatch and Culbertson. Certain general conclusions may be made by a study of their researches. First may be considered the case of obstruction by strangulation of a coil of gut—the most common form as seen in strangulated hernia. Experimental work has demonstrated that the congestion, stagnation, and anoxæmia in the vessels of the loop consequent on strangulation cause degenerative changes in the walls of the intestine resulting in the rapid formation of a histamine-like substance which is both poured into the lumen of the gut and also escapes through the peritoneal coat of the bowel. If the strangulation persists, microbic invasion of the intestinal wall occurs and deadly bacterial toxins are formed which also may penetrate the serous coat. At the same time a considerable volume of blood may be imprisoned in the loop.

It will be seen therefore that there are four dangerous factors which may combine in varying proportions and lead to a fatal termination. First a non-bacterial toxin, secondly a bacterial toxin, thirdly loss of blood from the general circulation, and fourthly a terminal perforative peritonitis. It is clear also—and every surgeon of experience knows this to his sorrow—that relief of the strangulation may not immediately relieve the patient. It may make him worse. When the local circulation is restored a much greater amount of one or both toxins is absorbed into the general circulation and immediate and profound depression may result.

These investigations have a direct bearing on treatment. Inasmuch as toxins escape through the serous coat of the bowel the operator should take care to remove as much of the free fluid as possible. Since the tissues of the strangled loop are seriously damaged long before the gut is actually gangrenous it will be wise to resect any doubtful loop and not "give it the benefit of the doubt." The fact that in a strangled loop of any size a considerable amount of blood is lost to the general circulation should indicate a blood transfusion or saline infusion in any such case.

In the case of distended and obstructed small intestine of which the main vascular supply is not strangled it has also been shown that even moderate distension causes gradual damage to the mucosa and enables toxic substances to be absorbed which would normally be unable to pass through the mucous membrane. Such poisons also escape through the peritoneal coat of the bowel. The importance, therefore, of the relief of distension as well as the removal of any form of obstruction is clearly demonstrated. This may account for the beneficial results of enterostomy in some cases of ileus.

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CARDIOVASCULAR DISORDERS

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IT is a source of encouragement that an annotator on cardiovascular disorders should find difficulty not so much in collecting sufficient data concerning recent advances in this department of medicine, as in compressing the available material into the allotted space. Although it is inevitable that knowledge advances more rapidly in the direction of improved technique in diagnosis, nevertheless newer therapeutic measures have recently been submitted to clinical trial and have been found to be of value.

CARDIAC ENLARGEMENT

Dr. John Parkinson in his Lumleian lectures[12] dealt with enlargement of the heart, and contributed views which will remain for many years as authoritative on the various aspects of this important subject. Speaking of *percussion* as a method of studying cardiac enlargement he uttered timely words :—

> " Surely the time has come to revise our opinion of this primitive expedient which has outgrown its usefulness, and to require in the student some working knowledge of the radiological methods as applied to disease of the heart and great vessels. Nothing has been added to medical knowledge or progress through cardiac percussion since the beginning of this century and in the light of X-rays it will shrink to obsolescence."

Parkinson also directed attention to the error of regarding the displaced apex beat from *slight scoliosis* as evidence of cardiac enlargement. So common is slight scoliosis the explanation of a displaced apex beat that, if the presence of disease known to produce cardiac enlargement is in doubt, the influence of scoliosis in causing this shift of the heart must come under review before inferring that there is an increase in the size of the heart.

Concerning *acute dilatation* of the heart, Parkinson points out that it has gradually lost its original significance in a clinical sense, and that it is now a superfluous term in so far that it is never mentioned that heart failure is due to acute dilatation nor that it is synonymous with it. Acute dilatation should be strictly dissociated from any clinical features, whether symptoms or signs, which have been supposed to indicate or coincide with it. It will be an excellent thing if even in terminology the idea is abandoned that clinically the heart can dilate like a balloon in a few minutes or a few hours and thereby induce an abrupt and grave attack akin to heart failure.

ADHERENT PERICARDIUM

The subject of adherent pericardium has recently[12] come under review and it is evident that the existing conception of the clinical presentation of this condition needs revision. Hitherto adherent pericardium has been thought of as a cause of the " cor bovinum " and every instance of cardiac enlargement in which it was improbable that aortic incompetence and hypertension had produced the enlargement has been too readily assigned to the presence of adherent pericardium. Continued experience with routine radioscopy of patients with cardiovascular disease has, therefore, caused surprise that adherent pericardium is so rarely the explanation of cardiac enlargement. This doubt led to an inquiry into the incidence of cardiac enlargement in adherent pericardium, and the results emphasize that when enlargement of the heart is not due to hypertension, aortic incompetence is the most probable cause, especially if auricular fibrillation and mitral stenosis are present. These two conditions tend to suppress the clinical evidence of aortic incompetence particularly the collapsing nature of the pulse and the aortic diastolic murmur.

Four separate pathological types of adherent pericardium may be differentiated. It is possible to recognize two of these clinically, and a third can be identified by radioscopy.

Type 1.—Adhesions formed between the parietal and visceral layers of the pericardium either partially or completely obliterate the sac. The heart is not altered in size in about one-half of the cases in this group. When the heart is enlarged it is the result of valvular disease which is present as an associated lesion. This type can only be recognized at necropsy and therefore it is of no clinical importance.

Type 2.—Calcification is an added feature of cases in this group, and this facilitates the recognition of pericardial disease by radioscopy. The condition *per se* does not give rise to symptoms unless the effects demonstrated by the next two types happen to be present.

Type 3.—In this, as in the first type, adhesions obliterate the sac by binding firmly together the visceral and parietal layers of pericardium. Calcification is also frequently present, but cardiac enlargement is absent unless some other cause is operative. The special feature of this group, however, is the constriction of the superior and inferior venæ cavæ from adhesive pericarditis and this creates a characteristic clinical syndrome referred to as Pick's syndrome.

The clinical recognition of cases in this group has been clearly detailed by Paul White[16] who refers to the leading clues in the diagnosis in the following order: (1) The insidious onset of dropsy and œdema of the ankles in a young person. (2) Preponderant enlargement of the liver with ascites. (3) Increased prominence of the jugular veins. (4) Absence of evidence of heart disease and nephritis in a case presenting dropsy. (5) Low blood- and pulse-pressure. (6) Evidence of chronic pleurisy. (7) Radiological evidence of calcification of the pericardium. (8) Low voltage curve and flattening or inversion of the T wave in lead I or lead II or in both. (9) Previous history of pericarditis and polyserositis. Paul White also emphasizes that the Delorme operation of pericardial resection is the only cure for chronic constrictive pericarditis, and denounces as groundless the commonly expressed fear that constricting adhesions once removed may reform. He outlines four essentials for a succesful operation: (1) The evaluation of symptoms and signs that make the diagnosis certain. (2) The selection of a case that is more or less crippled and yet is a reasonable risk for the extensive operation that is necessary. (3) An expert anæsthetist. (4) An experienced thoracic surgeon who is bold and yet cautious, who will do enough to free the heart and yet not too much to endanger the patient's life.

Type 4.—Cases in this group are characterized by adhesions between the obliterated pericardial sac and the adjacent structures, namely the diaphragm, pleuræ, and sternum (mediastino-pericarditis). Although cardiac enlargement in these instances may be the direct result of chronic adhesive pericarditis, two points require emphasis in this connection. In the first place it is a comparatively rare condition, and secondly the influence of associated valvular lesions in producing enlargement of the heart even in the infrequent examples included in this group must not be forgotten.

THE HEART IN EMPHYSEMA

Attention has recently been directed to the changes occurring in the heart as a result of chronic lung disease, especially emphysema. The study of these changes has included clinical, pathological, radiological, and experimental observations. As Parkinson[12] points out, it is often difficult to estimate the extent to which the heart is affected in patients with emphysema because the symptoms of both lung and heart injury are in many respects similar, particularly with regard to dyspnœa. Before deciding on the frequency with which heart failure follows emphysema it is necessary to determine the incidence of cardiac enlargement, because it is unlikely that congestive heart failure will make its appearance in a heart which had not for some time previously showed enlargement. In 70 cases of chronic bronchitis and emphysema Hoyle[9] found radiological evidence of enlargement of the right heart, chiefly of the right ventricle and conus pulmonalis, in about one-half the cases, but congestive heart failure was seldom met with. Hypertension was a common association. Commenting on the same series of cases Parkinson[12] mentions that the frequency of cardiac enlargement in emphysema is far greater than the incidence of heart failure from this cause might lead us to expect. There is no doubt that associated cardiac disease, hypertension especially, is not only often combined but is also the more powerful cause of failure and death.

Oscar Brenner,[2] in a carefully detailed and comprehensive study of the pathology of the pulmonary circulation, pointed out that practically all the varieties of vascular disease occurring in the systemic circulation may be observed also in the pulmonary circulation but that the incidence varied. He stated that Ayerza's disease had in the past dominated the consideration of pulmonary vascular disease and that the concept of this condition had varied continuously since it was originally described. The cases of Ayerza's disease which had been described were indistinguishable from cases of failure of the right side of the heart secondary to chronic pulmonary disease and associated with fairly marked pulmonary atherosclerosis, and Brenner concluded that nothing was gained by retaining the term.

THE HEART IN THYROTOXICOSIS

The liability of the thyrotoxic heart to develop *auricular fibrillation* has long been known, but the exact cause of the arrhythmia is still undiscovered unless it be that it is the result of an increased susceptibility to the action of adrenaline. This is analogous to the finding that injection of adrenaline in thyroid-fed rats often initiates auricular fibrillation. The incidence of fibrillation in toxic goitre varies in the reported series from 6 to 27 per cent. and the variability of the figures is accounted for by the difference in the duration of the thyrotoxic symptoms. Brenner[3] found it present in 21 per cent. of his 53 cases, and thyrotoxicosis accounted for 10 per cent. of all cases of auricular fibrillation. Sir Thomas Dunhill[7] records that 84 per cent. of 260 patients with established auricular fibrillation on whom he had performed the operation of subtotal thyroidectomy regained normal rhythm after the operation, although some of them relapsed. In order to emphasize the prevalence of thyrotoxic symptoms in patients with hypertension, Parkinson and Hoyle[14] have submitted that the term *thyrotoxic hypertension* is applicable. In their report of 100 cases they point out that the frequency of the condition should revive the suspicion that chronic thyrotoxicosis is one of the causes of hypertension (thyrogenic hypertension). For the sake of completeness mention can also be made here of the observations of Parkinson and Cookson[13] on the *size of the heart* in 130 patients with toxic goitre as determined by radioscopy. Undue prominence of the pulmonary arc in the cardiac outline was discovered in about one-third the cases, and in nearly one-half there was an appreciable enlargement of the complete cardiac shadow. They concluded that cardiac enlargement was important from the standpoint of the surgical treatment of goitre. When present it is an added reason for, rather than a contra-indication to, surgical treatment. Though the greater the enlargement, the poorer is the prospect of a complete return to normal, yet the aid of surgery will often be required to check the progress of the lesion.

THE HEART IN MYXŒDEMA

Campbell and Suzman[5] as a result of their study of six patients with myxœdema concluded that some degree of enlargement of the heart was expected in most cases. Often dyspnœa and slight œdema of the feet were present and suggested the onset of heart failure. More rarely severe congestive heart-failure with gross œdema and ascites was met with. All these abnormal manifestations disappeared with adequate thyroid treatment.

TOTAL THYROIDECTOMY IN THE TREATMENT OF HEART DISEASE

Blumgart and others[4] reporting on the results of total thyroidectomy in thirty-six patients with arteriosclerotic heart disease which included angina pectoris, cardiac asthma, and congestive heart-failure, came to the following conclusions. Total ablation of the thyroid gland offers an opportunity to increase the years of useful work and happiness in patients with arteriosclerotic heart disease in which the expectancy of life is necessarily limited by their advanced age. The results in paroxysmal nocturnal dyspnœa were especially noteworthy, particularly since medical therapy can do little to relieve or prevent the progress of this condition. In spite of advanced years and poor physical condition these patients stand the operation well, but the presence of renal impairment, chronic lung disease, or persistent œdema increased the operative risk tremendously so that the operation is contra-indicated in these patients. The therapeutic benefit of total thyroidectomy corresponded with the lowering of the basal metabolism, and when this was reduced to minus 30 per cent. myxœdema frequently supervened, but this responded to small doses of thyroid without materially detracting from the improvement obtained by lowering the basal metabolism. The presence of hypertension was not a contra-indication for total thyroidectomy, but in no instance did the operation cause an appreciable lowering of the blood pressure. Levine and Eppinger[11] analyzed the results obtained in 42 cases in which removal of a normal thyroid gland had been carried out in the treatment of intractable heart disease. They found that total thyroidectomy produced specific clinical improvement in cases which were refractory to the ordinary methods of treatment. This seemed to be much more definite in those with angina pectoris than in those with congestive heart-failure. They recommended that the operation should be undertaken only after the most careful consideration of the diagnosis and prognosis. Furthermore, it should be evident in those cases submitted to operative treatment that the recognized methods of treatment had failed and that the operation was likely to result in improvement which could not be achieved by other means.

TREATMENT OF HEART FAILURE

The advantages of a reliable diuretic as an adjuvant to digitalis in the treatment of congestive heart-failure are being more generally recognized. Salyrgan has proved to be a potent diuretic without producing toxic symptoms. It only possesses the disadvantage that it has to be administered intravenously. Any preparation, therefore, which is both efficacious as a diuretic and which can be administered in a convenient way, is a welcomed advancement in the therapeutics of congestive heart-failure. Parkinson and Thomson[15] have submitted to clinical trial a suppository containing 0·5 gm. of *novurit* in cocoa butter. Novurit is a mercurial diuretic combined with theophyllin. The effects of a suppository of novurit was compared with those obtained when novurit or salyrgan were administered by the intravenous route in the same patient. As a result of their investigation they arrived at the following conclusions. (1) The average twenty-four hours' excretion of urine per dose was for the novurit suppository 87 oz., for novurit intravenously 121 oz., for salyrgan intravenously 91 oz. (2) The previous administration of ammonium chloride results in an increased diuresis with the suppository as in the case of novurit and salyrgan intravenously. (3) With the suppository 68 per cent. of the diuresis occurred within the first twelve hours while the corresponding figure for salyrgan intravenously was 81 per cent. The diuresis does not extend beyond twenty-four hours. (4) No toxic or irritative effects of the suppository have so far been detected. Free evacuation of the bowels is desirable, although not essential, and if an aperient is necessary, it should be given forty-eight hours before the suppository. (5) It is concluded that novurit suppository is an effective and safe diuretic.

GALLOP RHYTHM

Phonocardiography has revived interest in the interpretation of triple rhythm, of which the gallop variety is the more important. Duchosal[6] stated that although muscular hypotonicity of the ventricle was necessary for the production of a gallop rhythm, an increase in the volume of the auricular blood-wave passing into the ventricle in advanced decompensation was also an important factor. Bramwell[1] reviewed the clinical findings and progress in a series of 62 cases presenting gallop rhythm and he has recorded the following conclusions. (1) Presystolic gallop is a sign of great clinical significance, and for this reason alone it should be clearly distinguished from all other types of triple rhythm. (2) Gallop occurs most frequently in patients with hypertension, advanced coronary disease, or acute inflammatory lesions of the heart. (3) It is an extremely grave sign in prognosis and very few patients live for more than two years after gallop develops. (4) True gallop rhythm is not causally related to auriculo-ventricular block nor to bundle, branch block. (5) Auricular contraction, tachycardia, and a failing heart are the factors essential to the production of gallop. (6) It is suggested that the additional impulse in gallop is produced by sudden distension of the ventricle, and the additional sound by vibrations of the ventricular wall, both these phenomena being due to an abnormally rapid rate of filling of the ventricle when the myocardium is lacking in tone.

RADIOSCOPY OF THE HEART AND GREAT VESSELS

Now that visualization of the heart by X-rays is becoming a routine method of examination of a patient suspected to have cardiovascular disease, the thorough anatomo-radiological investigation of Laubry and his co-workers[10] has been a valuable contribution to our knowledge. It has confirmed the conception of the particular segments of the heart or great vessels represented in the cardiovascular silhouette as seen by X-rays in the three orthodox positions. These workers inflated the lungs in the cadaver and radiographed the body in the upright position after injecting a radio-opaque substance, at one time into the jugular vein to fill the right chambers of the heart, and then into the carotid artery to fill the left chambers. The right border of the vascular pedicle when viewed in the anterior position is formed by the superior vena cava, and the left border by the left subclavian vessels. The right border of the cardiac silhouette is represented by the right auricle and inferior vena cava below, while the left border from above downwards is made up of the aortic knuckle, a short portion of the descending aorta, pulmonary artery, conus of the right ventricle and the left ventricle. Confirmation of the interpretation of the shadows outlined in the oblique positions was also obtained. The visualization of the barium-filled œsophagus by radioscopy has provided a means of defining accurately the posterior limits of the cardiac shadow which would otherwise remain obscure in all three positions. Similarly it provides information concerning the displacement and distension of the cardiac chambers and elongation, dilatation, or displacement of the great vessels. Recently I recorded[8] observations on the course of the œsophagus in health and in disease of the heart and great vessels. The relationship of the œsophagus to the aortic arch, the trachea and bronchi, and to the pulmonary artery was studied by dissection of the cadaver, and also by radioscopy of an anatomical specimen of the contents of the posterior mediastinum after impregnating the œsophagus, aorta and bronchi with varying concentration of barium emulsion. The barium-filled œsophagus was also observed by orthodiagraphy and teleradiography in healthy students, in healthy children under the age of thirteen years, and in patients, both children and adults, with cardiovascular disease. Four segments could be identified where the direct downward course of the œsophagus became interrupted as the result of pressure by adjoining viscera. I have referred to these interruptions as *impressions* and designated them from above downwards as the aortic arch impression, left bronchus impression, left auricle impression, and descending aorta impression. The left ventricle occasionally made contact with the œsophagus but this impression may be absent even when there is considerable distension of the ventricle present. The contour of each impression altered when the patient was rotated to the right or left, and although it was always necessary to examine the individual impression in the three conventional positions, there was found for each an optimum viewpoint in which the particular curve was best portrayed.

The *aortic arch impressian* was altered in congenital dextrocardia, in right-sided aortic arch, in the case of an abnormal right subclavian artery, in aortitis, in aortic atheroma, in the presence of carcinomatous bronchial glands, in distension of the left auricle, and by abnormal conditions above the aortic arch. The *left bronchus impression* was altered in mitral stenosis, in the presence of enlarged bronchial glands, and by conditions which caused pressure on the left bronchus.

The *left auricle impression* was changed by the distended left auricle of mitral stenosis, by an enlarged left ventricle, and by aneurysm of the descending aorta. The *descending aorta impression* was disturbed by enlargement of the left auricle or ventricle, by aortic atheroma or aortic aneurysm, and by a raised diaphragm from any cause. The investigation gave proof of the necessity of visualizing the barium-filled œsophagus by radioscopy in every patient in whom cardiovascular disease is suspected.

ERYTHROCYTIC SEDIMENTATION RATE IN DISEASE OF THE HEART

Wood[17] investigated the sedimentation rate in 164 cases of heart disease. He found that congestive heart failure retarded the sedimentation rate regardless of the type of heart disease causing the failure. Increased rates were recorded in active rheumatic carditis, syphilitic aortitis, and cardiac infarction. The rate was increased in subacute malignant endocarditis and malignant hypertension.

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DISEASES OF THE BLOOD-FORMING ORGANS

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PERNICIOUS ANÆMIA—The treatment of pernicious anæmia continues to receive much attention. It cannot be emphasized too frequently that this anæmia is a permanent deficiency disease requiring adequate replacement therapy for the remainder of the patient's life. Treatment consists in the administration of the stomach or the liver anti-pernicious anæmia principles in the form of hæmopoietically-potent extracts or preparations in amounts sufficient to produce and maintain a normal blood-count. The dosage must be controlled by regular blood-counts every few months but the presence of glossitis, diarrhœa, or the symptoms and signs of spinal-cord involvement definitely contra-indicate any reduction in treatment until they are relieved, irrespective of the blood level. Many methods have been tried for enhancing the hæmopoietic activities and palatability of these preparations or improving the method of treatment.

The use of desiccated hog's stomach (in doses of 1 oz. daily) still continues to prove one of the cheapest and most reliable methods of treatment and this is particularly so when neurological and gastro-intestinal symptoms are present.[1] Consequently, attempts have been made to incorporate stomach preparations with liver fractions with and without preliminary incubations and good results are being claimed for this method of treatment. The active principle in the stomach preparations is hæmopoietin which has been shown to be the gastric enzyme essential for prevention of pernicious anæmia. Concentrated odourless and tasteless preparations containing hæmopoietin (fraction P.5 of Wilkinson and Klein) were described in 1932, but it is only recently that they have been used extensively. These observations have been confirmed in Denmark and Sweden and small doses of this stomach product are being used for the routine treatment of pernicious anæmia with considerable success—the blood counts being readily maintained at higher levels than with liver products. The source of hæmopoietin appears to be the pyloric glands of the stomach and the Brunner's glands in the duodenum according to the work of Meulengracht who has produced good clinical responses using desiccated preparations prepared from the tissues rich in these glands. Aqueous extracts of desiccated hog's stomach have been prepared and an investigation of the properties and hæmopoietic potencies of the substance so obtained have completely confirmed the results previously reported using the hæmopoietin fraction of stomach.

The value of *liver extracts* prepared for parenteral injection has been still further appreciated. Clinicians in many countries have described their results employing different parenteral liver fractions. It is universally agreed that parenteral treatment of pernicious anæmia with these products is very efficient and cheap, and enables definite therapy to be given to the patient whatever the clinical condition. This is the only satisfactory method of treatment when the anæmia is associated with impairment of gastro-intestinal absorption (see below). The responses are dramatic and the subsequent maintenance doses are such that only occasional small injections need be given at intervals of two to six weeks, thus eliminating the inconvenient daily ingestion of oral extracts or fresh liver. This treatment consists of the intramuscular or intravenous injection of selected liver extracts in doses of 6 to 12c.cm.

spread over two to three days, depending upon the severity of the anæmia and the particular product used. The hæmopoietic value of the liver extracts is not proportional to the amount of fresh tissue that they represent but is measured purely by their demonstrated potencies *when tested clinically.* For that reason it has again been repeatedly emphasized that only those products should be used each batch of which is clinically tested before issue. With satisfactory responses to this treatment maintenance is ensured by the administration of 2 c.cm. intramuscularly as often as is indicated by the symptoms and blood counts. Adequate treatment with parenteral liver extract is extremely effective and has been fully considered recently[1]. A combination of parenteral liver therapy in the early stages followed by oral stomach powder (1 oz. daily) has also proved to be a particularly good method of treatment. Statistical results indicate the great advance that has been made in the therapy of pernicious anæmia.

During the past year further steps have been made in the fractionation and purification of these liver extracts. Dakin and West described the preparation of a fraction of which only small doses (80 to 120 mgm.) were required for the successful treatment of cases of pernicious anæmia. Their work has been confirmed by two groups of investigators in this country. In Manchester, a much more highly potent fraction has been made and used in a total dosage of only 18 to 36 mgm.; similar fractionations have been carried out in Scandinavia. Despite the extreme potencies of these special liver fractions the difficulties associated with their manufacture often leads to inactive batches so that clinicians must exercise caution in using them in seriously ill cases unless *each* batch is guaranteed to have been *clinically* tested before issue.

Attempts have been made to increase the hæmopoietic potencies of liver and liver extracts by autolysis and also by digestion with gastric tissue or juice. Most of the published results in this connection are unconvincing.

Failure to respond to anti-pernicious anæmia treatments using liver or stomach means (i) incorrect diagnosis; (ii) inadequate dosage; (iii) inactive preparations; (iv) inactivation of the therapeutic substance by methods of preparation before use; or (v) sepsis or complications.

OTHER MEGALOCYTIC ANÆMIAS

During the last two or three years much work has been carried out on a group of miscellaneous anæmias resembling pernicious anæmia. In pernicious anæmia the primary defect occurs in the stomach with a deficiency of hæmopoietin and other constituents of the gastric juice, while the liver in these relapsing cases does not contain any anti-pernicious anæmia factor. Normally hæmopoietin (intrinsic factor) reacts with the extrinsic factor present in certain foods to form either the liver anti-pernicious anæmia principle or a precursor of it, which is then absorbed in the alimentary tract and taken to and stored mainly in the liver as the anti-pernicious anæmia factor. Interference with any of the series of reactions and mechanisms necessary in the formation and storage of the anti-pernicious anæmia factor leads to the development of anæmia of the Addisonian type, but certain of the clinical and pathological findings may differ according to the stage at which the gastro-hæmopoiesis is impaired

Consequently, a megalocytic hyperchromic anæmia may be seen in conditions such as extreme starvation or dieting (insufficient extrinsic factor), destruction of gastric mucous membrane by corrosive poisons, toxins, gastritis, or removal of the hæmopoietin-secreting glands as in gastrectomy (deficiency of hæmopoietin) gastro-enterostomy (inhibition of digestion of extrinsic factor by hæmopoietin), sprue, idiopathic steatorrhœa, chronic intestinal obstruction or stenosis (impairment or failure of intestinal absorption), and complete or partial dysfunction of normal storage of anti-pernicious anæmia factor in the liver. Inability to store the anti-pernicious anæmia factor is seen in hepatic cirrhosis. A partial impairment of storage appears to exist in the " hæmolytic " or megalocytic anæmia of pregnancy. The treatment of these anæmias is identical with that already described for pernicious anæmia. The majority of the megalocytic anæmias are readily differentiated from true Addisonian pernicious anæmia.

On the other hand *achrestic anæmia* (Wilkinson and Israëls) is a severe megalocytic hyperchromic anæmia unaccompanied by disturbances of the gastro-intestinal tract or central nervous system, pyrexia, or evidence of hæmolysis. In contrast to pernicious anæmia, free acid is found in the gastric juice and there is a poor response, eventually a total lack of response, to anti-pernicious anæmia treatment. Nevertheless, the bone-marrow shows a marked megaloblastic hyperplasia with few erythroblasts and normoblasts resembling and sometimes even more marked than that seen in pernicious anæmia; it is quite different from the patchy cellularity seen in some cases of aplastic anæmia. The liver has been shown clinically to contain ample quantities of the anti-pernicious anæmia factor and microscopically shows no lesions apart from those attributable to long-standing anæmia. No toxic cause has been traced even after prolonged observation. The anæmia is apparently due to failure of utilization or mobilization from the tissue stores of the anti-pernicious anæmia principle necessary for the maturation of the megaloblast. Treatment, unfortunately, has proved disappointing. Intensive parenteral liver and oral stomach and liver therapy, together with repeated blood transfusions have maintained these patients for a time but ultimately the disease proves fatal. At autopsy the most striking lesion is the intense megaloblastic hyperplasia of the whole of the bone marrow.

HYPOCHROMIC AND NUTRITIONAL ANÆMIAS

The hypochromic nutritional anæmias constitute by far the commonest type seen in medical practice and include hypochromic iron-deficiency anæmias of infancy and pregnancy, idiopathic hypochromic anæmia, anæmias secondary to hæmorrhage, and chlorosis. Idiopathic hypochromic anæmia is usually seen in women between 40–60 years of age and appears to be associated more especially with the child-bearing period and the menopause. Achlorhydria, glossitis, and koilonychia are frequent features, while in some dysphagia is marked (Plummer-Vinson syndrome). Men rarely develop this type of anæmia except following malignant disease of the stomach and colon, and gastric operations. Hypochromic anæmia is also seen following gastrectomy or gastro-enterostomy (usually after an interval of a few months or years) so that post-operative treatment should always include intermittent courses of iron as a prophylactic measure.

The part played by inadequate diet and poor living conditions has been demonstrated by several well-controlled investigations in different parts of the country. Thus, investigations in Aberdeen have shown that the incidence of anæmia is highest in women of the reproductive age who have borne children and is most marked in the latter part of that period. After the menopause there is a lowering of the prevalence of the anæmia. Further, it was shown that nutritional iron-deficiency anæmia was present in 41 per cent. of infants under two years of age. Apart from organic disease, this type of anæmia is not seen in males taken from the same cross section of the community. These results confirm similar observations that have been made elsewhere notably by Mackay (London) who has drawn attention to the close relationship between the nutritional iron-deficiency anæmias in infants and the similar anæmia in the mothers. Consequently, the iron-deficiency anæmia of infants is a sequel to a poor supply of iron to the fœtus by the anæmic mother, and is also associated with prematurity, absence of iron from the milk diet, and gastro-intestinal disturbances causing diarrhœa or loss of appetite. It has been suggested by Patek and Heath that chlorosis has not disappeared and is due to the exaggeration of a normal tendency towards anæmia in adolescent girls, created by the increased demand for iron, made by growth and by menstrual loss, and by diet insufficient in iron-containing foods.

Treatment of these nutritional iron-deficiency anæmias is extremely simple and consists in remedying the deficiency of iron in the diet. This is most conveniently and economically carried out by the use of ferrous salts such as ferrous chloride or sulphate (9 to 18 grains daily), carbonate (Blaud's pill—75 to 90 grains daily) or ferric ammonium citrate (90 to 120 grains daily). Infants are given up to 15 grains of ferric ammonium citrate daily in their feeds; other preparations are best incorporated in a syrup. It is also of advantage to ensure adequacy of nourishment for these patients by the addition to the diet, if necessary, of marmite (a teaspoonful), and vitamins in the form of fresh fruits, salads and fresh vegetables, and additional food.

Copper and bile pigments.—Varying reports have been published as to the value of other metallic salts in the treatment of hypochromic anæmias. Copper and manganese have both been stated to be essential for the proper utilization of iron, but nevertheless it still remains true that iron alone can supply the complete treatment unless it is that the minute amounts of copper in the iron preparations furnish adequate supplies. If so, then further copper is unnecessary and it is not clear that such addition is altogether free from ultimate danger. It has been suggested that the addition of chlorophyll or bile pigment enables the iron dosage to be reduced but this requires further confirmation.

The hypochromic anæmia of pregnancy and puerperium is the most frequent anæmia associated with pregnancy and closely resembles the nutritional iron-deficiency anæmia, with which it is probably identical in the majority of cases seen in industrial areas. This anæmia is of the usual hypochromic microcytic type but is not always associated with achlorhydria. Treatment with massive iron therapy has proved of extreme value in these patients; no ill effects have been noted, post-partum hæmorrhage is reduced and if treatment has been given for sufficient time the babies are less liable to anæmia. Consequently, the administration of iron to all pregnant women would appear to be an important routine prophylactic measure. In considering pregnancy anæmia it should be noted that a megalocytic anæmia is occasionally associated with pregnancy, and treatment then consists of the usual anti-pernicious anæmia therapy with liver or stomach. If the condition is the megalocytic anæmia of pregnancy without achlorhydria then treatment can be discontinued permanently when the blood count is normal. On the other hand the first manifestations of true pernicious anæmia may occur during the second or third trimesters of the pregnancy, and treatment must then be continued as described under pernicious anæmia.

HÆMOLYTIC ANÆMIAS

Anæmias of hæmolytic type have been reported from time to time but their classification still offers considerable difficulty. Repeated blood transfusions offer a satisfactory procedure for the treatment of acute hæmolytic anæmia of Lederer but the mortality rate is still high; the condition is associated with acute hæmolysis which fails to respond to ordinary anti-anæmic therapy. Acholuric jaundice appears to respond best to splenectomy after preliminary blood transfusion. It is important, however, that operation should not be carried out unless the platelet count is subnormal since removal of the spleen often leads to a considerable increase in platelets to well over one million within the following seven to ten days, with the risk of thrombosis. Subsequently the number of platelets decreases to normal, while the red cell fragilities become less abnormal.

APLASTIC AND TOXIC ANÆMIAS

Cases of true aplastic anæmia still continue to be reported following exposure to toxic substances. Apart from the well-known agents (arsenic, gamma and X-rays, benzol, and substituted derivatives of benzol) many cases have been recorded after the use of gold salts, dinitrophenols, proprietary products such as hair dyes, shoe polishes, and after the use of certain solvents in industry. Although occasional cases of idiopathic aplastic anæmia are reported to have been cured by the use of extracts of liver, stomach, spleen and thyroid, the diagnosis has not always been clear and little advance has been made in the treatment of aplastic anæmia; repeated blood transfusions still appear to be the only therapy of any value.

ANÆMIA FOLLOWING RADIOTHERAPY

Attention continues to be concentrated on the effects of X-rays and radium on the blood and blood-forming organs. Recent investigations have further established the marked sensitivity of the lymphocytes and the lymphogenic tissues when exposed to radium and rœntgen rays.

During routine radio-therapy the number of circulating lymphocytes may be reduced to less than 50 per c.mm. in the space of ten to twenty days, according to the magnitude of dosage and the method employed. It has been established that the fall in the number of blood lymphocytes is proportional to the dosage of gamma-ray irradiation employed. Routine observations have led to the conclusion that therapy should be suspended when the total leucocyte count falls to 1200 per c.mm. or when the absolute lymphocyte level reaches 125 per c.mm. The period required for the re-establishment of a normal blood-picture after treatment, has been found to be a long one (six to twelve weeks or longer), and none of the usual hæmopoietic stimulants have been found to accelerate this recovery satisfactorily or to prevent these ill-effects. Over-exposure on the part of the radium workers also leads to leucopenia and neutropenia in varying degree and it has been found essential that a white cell count of 5,000 per c.mm. should be considered the danger limit; any worker showing a count below this with a neutropenia must be removed at once from the sphere of exposure for at least three to four weeks. There is no doubt that these changes are due to inhibition of leucocyte production by damage to leucopoietic and particularly to lymphogenic tissues.

AGRANULOCYTOSIS

Cases of agranulocytosis have been seen with greater frequency during the last twelve months. The diagnosis of the condition is of considerable importance since it is readily confused, at least in the early stages, with acute leukæmia and aplastic anæmia, for it is common to find some degree of granulopenia associated with varying degrees of aplasia of the erythropoietic tissues. The essential points in diagnosis are (i) a history of sudden onset—usually only a few days, (ii) the occurrence of ulcerative or necrotic lesions in the mouth (or elsewhere) which do not correspond to the severity of the illness, while bacteriological examination only reveals organisms of low or moderate pathogenicity, (iii) pyrexia and severe prostration, (iv) absence of generalized glandular enlargement although those glands adjacent to the buccal ulceration are often enlarged and tender, (v) absence of hæmorrhages, (vi) slight anæmia, few or no immature white cells, and complete or nearly complete absence of granulocytes from the circulating blood. It is necessary to emphasize these points since several cases described in the literature recently are not examples of agranulocytosis and thus tend to give false impressions both as to the frequency of the condition and the value of the treatments employed.

The etiological importance of amidopyrine, dinitrophenols, arsphenamine, benzol, bismuth and gold salts has shown the danger of their indiscriminate use without adequate control; the apparent idiosyncrasy of susceptible persons to these substances renders difficult their detection since ordinary therapeutic doses bring about a rapidly fatal onset of the disease.

Although *treatment* of agranulocytosis is still far from satisfactory about 25 per cent. of the true cases appear to respond to pentnucleotide with or without blood transfusion. This is a distinct advance over the previous mortality rate of over 90 per cent. Cases of chronic neutropenia do not appear to respond to pentnucleotide. Treatment must be directed to (i) the elimination of all possible causes such as drugs (amidopyrine which was a frequent constituent of many proprietary mixtures and preparations; dinitrophenols used in obesity cures; benzol; arsenic and gold salts); (ii) the immediate treatment of the blood condition itself (pentnucleotide 20-60 c.cm. intramuscularly or intravenously daily until a definite improvement is noted in the blood, then gradually reducing to 20 and 10 c.cm. for a few days each); (iii) local treatment of the oro-pharyngeal lesions (mouth washes); (iv) prevention of relapses with maintenance of a normal blood-picture by periodical blood examinations, protection from the deleterious drugs, and a short course of pentnucleotide if indicated by a returning neutropenia.

LEUKÆMIA

In common with other blood diseases it is becoming recognized that an accurate diagnosis is often only possible by a careful survey of all the clinical and hæmatological evidence available; single abnormal signs may be misleading. In acute leukæmia the most important signs are (i) a severe and rapidly progressing illness, (ii) severe anæmia, (iii) an abnormal differential white cell count, either a high proportion of immature myeloid cells or an overwhelming proportion (95 per cent. or more) of lymphoid cells. The total white cell count may be within or below normal limits; there may be no enlarged lymph glands or palpable spleen. The chronic leukæmias as a rule present no difficulty as the white cell count is high, the differential count clearly abnormal, and the patients show enlargements of spleen and lymph glands varying with the type of leukæmia. In addition to the myeloid and lymphatic types of leukæmia a monocytic type has been recognized in acute and chronic forms. Clinically it resembles the other leukæmias although ulceration of the mouth is said to be more common. The white cells are mostly monocytes of three types, not all of which may be present, (i) normal monocytes, (ii) monocytes with highly lobulated nuclei superficially resembling polymorphonuclears, and (iii) monoblasts; intermediate immature forms also occur. Some believe that it is only an atypical myeloid leukæmia. X-rays remain the method of choice in the *treatment* of chronic leukæmia and it is often possible to control the disease sufficiently to allow the patient to lead a normal life for some years. Increasing anæmia and an increasing proportion of immature white cells are signs that control is being lost. For acute leukæmia most reports indicate that X-rays in all grades of dosage are of no effective use; blood transfusions have only a transitory effect; liver, arsenic and hog's spleen are equally inefficacious.

HÆMORRHAGIC DISEASES

Thrombocytopenic purpura is frequently associated with acute leukæmia and aplastic anæmia in their terminal stages, while thrombocytopenia has also been noted in agranulocytosis. It is thus important to exclude the presence of other blood diseases by full blood counts, and estimation of the number of reticulocytes, differential red cell fragilities, bleeding time, coagulation time, prothrombin time, Price-Jones curve, and fractional gastric analysis. Acute and chronic purpura hæmorrhagica are frequently seen without any obvious cause to account for them. Treatment must be considered carefully according to the severity of the condition; blood transfusions give the most rapid temporary relief, but it is frequently necessary to consider further measures. Splenectomy, preceded by blood transfusion, has proved of great value in those cases having low platelet counts, but where the number is close to the normal great caution must be exercised on account of the rapid and big increase that follows removal of the spleen. The risk of thrombosis and fatalities appears to be much greater than is the case in acholuric jaundice or splenic anæmias. A high platelet count definitely contra-indicates operative procedure. Recovery after successful removal of the spleen usually leads to complete cure of the condition, although occasional attacks of hæmorrhage may be seen.

Recent investigations have lead to the discovery that many patients suffering from purpura hæmorrhagica have subnormal excretions of vitamin C. On the basis of this, treatment has been directed to correcting the deficiency by administering large doses of vitamin C in the form of lemon juice (6 lemons daily) or as pure ascorbic acid 150-600 mgm. daily, preferably by the intravenous route, although oral administration is also of value. The results obtained have been variable. I have certainly seen good results in some cases of severe purpura hæmorrhagica. Numerous other therapeutic methods have been employed without success. Good results have been claimed following the intravenous injection of 10 c.cm. of 1 per cent. solution of Congo red which is known to increase the platelets experimentally in animals. Quite recently diluted snake venoms have been employed in the treatment of hæmorrhagic diseases, but more especially hæmophilia. The venoms of the Russell's viper and the moccasin snake have been employed. The latter has been administered subcutaneously and intradermally and is said to reduce the capillary permeability. Their chief values, however, appear to be in controlling hæmorrhage by direct application to the bleeding points. Using these agents it has been possible to remove septic teeth with safety in patients with a hæmorrhagic diathesis such as hæmophilia. Russell's viper venom appears to be particularly efficient in this respect and should be used when troublesome hæmorrhages occur in hæmophiliacs. Continental clinicians have claimed good results from thrombin preparations made from muscle extracts and also solutions of esters of oxymethyl-galacturonic acid (prepared from apple pectins). While the results said to follow their parenteral use are undoubtedly exaggerated, the products appear to have some value when used for direct topical application. Further data is needed before their values can be assessed.

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DISEASES OF THE LUNGS AND PLEURÆ

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THE lungs and pleuræ are delicate and vulnerable structures which, until a comparatively recent date, have been regarded as inaccessible to surgery and, indeed, difficult of approach by any form of mechanical therapy. Stress must be laid at the outset upon this aspect of the subject, not from any undue surgical bias, but because the development of modern thoracic surgery appears to be the outstanding feature of the pioneer work of the last twenty or thirty years so far as this region of the body is concerned. It has had its effect upon our conception of the pathology of diseases of the respiratory organs, and may fairly be claimed as yet another example of the debt which science owes to practical medicine.

PULMONARY TUBERCULOSIS

In reviewing advances in the diagnosis and treatment of this widespread malady emphasis must first be placed upon the importance of the modern conception of the pathogenesis of tuberculosis in contrast with the earlier ideas, which followed as a natural corollary of Koch's discovery of the tubercle bacillus. The gradual development of the theory of endogenous re-infection from the primary focus of childhood led eventually to a wider view of the real nature of pulmonary tuberculosis, and this has profoundly affected our ideas both as to its prognosis and as to its treatment. It must, however, be said even now that progress is delayed owing to the inability of many to regard tuberculosis as essentially a general rather than a local disease. The most important effect which has followed the teaching of the modern pathogenesis is a realization of the truth that the keynote to the problem of phthisis is the study of tuberculosis in the child. In addition to the pioneer work of Parrot, Ranke, von Behring, Ghon, and many others, came the masterly teaching of Aschoff, which laid the foundation of the vast structure of subsequent research by numerous workers; among these Opie and McPhedran in the United States and Blacklock in Glasgow are perhaps the most outstanding. The conception of active tuberculosis as a manifestation of allergy has doubtless, more than any other idea, modified our views as to the prognosis of phthisis in individual patients. It has certainly clarified the notions of the classification and assessment of cases, and has given a more intelligible explanation of the variations in the clinical picture and in the course of the disease. Such an increase in knowledge of the fundamental pathology may well influence the method of approach to the vital question of treatment.

In *diagnosis* of tuberculous lesions of the lung, the information afforded by X-rays is of paramount importance, and it appears no exaggeration to say that among all modern advances in this subject those of radiology may well be given pride of place. Increase in the accuracy of radiological interpretation in the last few years has been due largely to the vast improvement on the technical side, and the importance of the modern high-powered plant to the clinician can hardly be over-estimated. It has been well said that in the diagnosis of chest disease a bad X-ray is worse than no X-ray at all. Although perhaps, ideally, clinician and radiologist should work together, it seems inevitable that in the future many physicians will have to be radiologists also, and training in the groundwork of chest radiology is likely to become an integral part in the curriculum of the future specialist in diseases of the chest.

As regards the laboratory aspects of phthisis, little need be said about the bacteriology of the bacillus of Koch, though some reference is, perhaps, desirable to the light which has been thrown by the recent work of Griffith, Munro, Lange, and others on the rôle of the bovine bacillus, the importance of which in the epidemiology of the disease has hitherto been somewhat underestimated. Attention has lately been drawn by various observers to the presence of acid-fast bacilli in the stomach contents, obtained by the method of gastric lavage in cases in which sputum is not available. Collis and others have laid stress on the importance of such examinations, not only by reason of their diagnostic importance in suspected tuberculosis of childhood, but also as throwing light upon the nature of many of the so-called para-tuberculous diseases such as erythema nodosum.

The value of blood examinations in phthisis has been a subject of increasing interest in the last few years. The blood sedimentation rate, when determined under constant conditions and by a standard technique, has been shown to be of genuine assistance to the physician as a prognostic measure. A more elaborate investigation of the blood has been advocated by Lyle Cummins who, in addition to the blood sedimentation rate, took note of the variations in the Arneth count and in the differential leucocyte count. This work has been followed up by Houghton, whose observations upon the hæmogram in pulmonary tuberculosis have furnished one of the most practical advances we have seen on the subject of prognosis in this disease. Although the technique requires considerable practice, and the possibility of individual error has to be reckoned with, there is little doubt that Houghton's index—which is an arithmetical calculation from the sedimentation rate, the differential count, and von

Bonsdorf's modification of the Arneth count—gives more accurate information as to the state of the phthisical patient than that supplied by any one of these three blood factors taken alone.

It is difficult to separate the question of *prognosis* from that of *treatment*, so much of the former being necessarily associated with the response to treatment on the part of the individual, whose case can hardly be assessed with any approach to accuracy until time and the results of therapy, whether routine or special, have given the clinician at least some space in which to orientate his outlook and thus to arrive at a just estimate of the state of affairs.

The introduction of *artificial pneumothorax*, perhaps the greatest fundamental step in therapeutics since the establishment of the sanatorium principle, can hardly be described as a recent advance, though even now it must be admitted that there is a regrettable lack of appreciation of the proper uses and limitations of this valuable mode of treatment. The chief gain of the last few years in respect of pneumothorax therapy has been an increasing knowledge of its scope, and especially of its possibilities in bilateral cases, in which it was formerly thought to be contra-indicated. For this reason bilateral pneumothorax therapy, whether alternate or simultaneous, may fairly be mentioned among the modern advances.

The application of major surgery to pulmonary tuberculosis was an inevitable corollary of artificial pneumothorax, and although the pioneers of surgical collapse therapy may be traced back well into the last century, it was not until the European war that surgery of the lung and pleura really became an established principle. Its later history is mainly one of the rapidly increasing efficiency of operative technique, as well as of steady progress in methods of administering anæsthetics, based upon a more accurate appreciation of physiological principles. The present-day operation of extra-pleural thoracoplasty, applied to pulmonary tuberculosis, is a technical achievement which, though doubtless still capable of modifications and improvements, has done much to reduce the risks of the purely medical case; such risks, as surgical colleagues have justly pointed out, must be clearly reckoned in any discussion in which operative mortality is advanced by the physician as an argument against surgical intervention.

Of the less severe surgical procedures the various operations for dividing adhesions deserve special mention as an example of the most useful developments of the last few years. Since Jacobæus introduced the thoracoscope as a regular means of diagnosis by direct inspection, its use in treatment has become more and more essential, especially in those cases in which the ultimate prognosis is rendered unfavourable by the persistence of an uncollapsed cavity. The employment of the diathermy cautery in place of the galvanocautery or the tenotome marked a step forward in operative technique. Many types of case formerly abandoned as unsuitable for cauterization on account of the size or complexity of adhesions have now been rendered operable by the more elaborate methods introduced by Maurer. The uses and limits of phrenic evulsion have been further differentiated and understood, and the combination of surgical with quasi-surgical methods have placed modern collapse therapy on a far more scientific and reliable basis.

Of medical measures and of symptomatic treatment in pulmonary tuberculosis there is nothing indeed that can compare with the march of surgery in this province, though the main principles which govern the general treatment of phthisical cases have lost nothing of their importance. The introduction of gold salts by Møllgaard gave a valuable addition to the list of useful drugs. Despite the untoward results which in the earlier years followed the administration of sanocrysin in unduly large doses, later researches have proved its undoubted value in many cases, if not as a specific, at least in tiding the patient over a difficult febrile interval, or as an adjunct to unilateral pneumothorax treatment where the condition is complicated by a spread of disease in the contralateral lung.

PNEUMONIA

While the main outlines of our knowledge of the pneumonias remain for the most part unchanged, much has been done in the way of investigation on bacteriological and histological lines to place that knowledge upon a more scientific basis, with the result that the modern conception of the disease is undoubtedly clearer, and treatment is, in one respect at least, more rational. The researches of MacCallum, Blake, Cecil, and many others in America, and in this country the work of Gaskell, Armstrong, Johnson, and Langley have shown the difficulty of maintaining the older traditional division of the different pneumonias, the only scientific classification of which is now recognized to be a bacteriological one. The logical result of such considerations is the attempt to introduce a standard of serological treatment, and Felton's work has been followed to such an extent that the serum treatment of pneumonia is now accepted as the one form of therapy which has definitely been shown to reduce the mortality from this disease. The practical difficulty so far has been the expense of preparation, but it would seem likely that, as in the case of insulin, this obstacle will prove eventually to be surmountable.

NON-TUBERCULOUS SUPPURATIVE LESIONS

It is, perhaps, in this branch of chest work that advance, both in diagnosis and in treatment, has been most conspicuous. The work of the American Empyema Commission in 1918 was undertaken with the specific object of inquiring into the reasons of the high mortality which attended operations for empyema following streptococcal pneumonia; the results of these investigations and the corresponding alterations in surgical procedure have certainly marked an epoch in the history of diseases of the chest. Not the least important improvement in the mode of approach to the problem of chest disease has been the growing tendency to regard intrathoracic suppuration from a more generic point of view, with the result that such conditions as empyema, whether acute or chronic, abscess of the lung, gangrene of the lung, and even bronchiectasis are now envisaged more as varied expressions of one main pathological process. This tendency to view the phenomena of inflammation as expressing the reaction of the body tissues to injury and to think of local lesions in terms of general pathology has been emphasized by the American pathologists, especially since the War. That it has affected in no small degree the general trend of thoracic surgery there can be little doubt, and this must be regarded as one of the most significant and valuable improvements in our attitude towards diseases of the lung and pleura.

Diagnosis and *treatment* in this particular branch of chest work have to a large extent gone hand in hand, their mutual dependence having been more obvious, perhaps, here than elsewhere. The increasing use of lipiodol injection, as well as the employment of the bronchoscope and the thoracoscope, has been a striking feature of the last decade, and the team-work now achieved in the special institutions for investigation of chest disease has fully justified the labour and expense which it necessarily involves. The treatment of bronchiectasis to-day is one of the most outstanding examples of the value of modern work. The accuracy of good bronchograms and the skill of the modern bronchoscopist have enabled a localization of this disease such as permits of a wider and more discriminate choice in the treatment to be adopted. Postural drainage is now employed with due regard to the dynamical principles involved, and its importance, not only as an essential form of medical treatment, but also as a pre-operative measure, is better recognized. The principles of adequate drainage of infected pleural effusions have in the last few years been made clear to an extent which leaves but little excuse for the existence of a chronic non-tuberculous empyema, a condition which has been shown in the majority of instances to be due to faulty management of the case in the earlier or acute stage. The use of tubes designed to ensure air-tight drainage and the employment when necessary of an effective suction apparatus have replaced the older methods adopted to bring about re-expansion of the lung ; the training of experts in the art of instructing patients in breathing and in appropriate movements of the chest after operation has contributed enormously towards the achievement of more satisfactory end-results.

NEW GROWTHS OF THE LUNG AND PLEURÆ

Malignant disease of the chest, which formerly was regarded as a curious rarity, has in the last decade become a subject of general interest and importance on account of the frequency with which it now appears, not only in special institutions, but also in general hospitals, and even in private practice. Although the ultimate position of the patient with cancer of the lower respiratory tract can hardly be said to have improved greatly, the outlook may reasonably be described as appreciably better than it was ten or fifteen years ago. Careful study of the symptomatology of lung cancer has led to a far clearer understanding of what constitutes early diagnosis. Histological research has showed that there is a considerable variation in the rate of growth and in the relative malignancy of the different types of tumours found in this region. The special methods of examination of the respiratory tract, already referred to in connexion with other intrathoracic lesions, have allowed diagnosis of these growths in a comparatively early stage, and modern surgical technique does offer a prospect of radical cure by lobectomy, or even by total pneumonectomy, in a limited number of cases. To describe such a state of affairs as an advance of modern medicine and surgery is, it will be granted, hardly an exaggeration.

In regard to the more active forms of palliative treatment, the impression is that, while radium has on the whole been disappointing in its effects, X-ray therapy still offers the possibility of results which will justify its employment. There is so far no criterion, other than that of experiment, of the extent to which a growth in the lung is sensitive to the action of X-rays; but the experience of those who have adopted this treatment on a sufficiently large scale to judge its value has certainly given cause for encouragement.

ASTHMA

The treatment of asthma still remains for the most part unsatisfactory, and such new remedies as have been introduced in the last few years have been essentially symptomatic rather than radical. The employment of a strong solution (1 per cent.) of adrenaline in a spray which ensures a fine suspension is one of the most recent and at the same time the most effective measures for the relief of bronchial spasm. It has the practical advantage of obviating to a large extent the need of the hypodermic syringe, and the apparatus designed by Messrs Parke, Davis and Co., for use with adrenaline of this strength is simple and easy of employment.

As regards the essential etiological factor of hypersensitiveness which characterizes the asthmatic type of patient, although a vast amount of work has been carried out by numerous observers in the attempt to achieve the desensitization of the individual, whether by specific or by non-specific measures, it cannot really be said that the final results are commensurate with the magnitude of the research or with the trouble and expense which it has involved. The importance of breathing exercises, designed to assist the patient in the primary difficulty of emptying an over-distended chest, may be mentioned among the more recent and on the whole less recognized mechanical methods of treatment which are undoubtedly worthy of greater attention.

THE PNEUMONOCONIOSES

The subject of the various industrial lung diseases has acquired an increasing importance of late, chiefly owing to the vast problem of compensation which it involves and the practical issue which this raises from the point of view of medical insurance. Research on the subject of silicosis has been carried out from the clinical, from the histological, and from the radiological standpoint. The same may be said of asbestosis. Although up to the present time these two are the only scheduled pulmonary dust diseases, the results of their investigation by numerous observers, working in collaboration with the Home Office, have opened up a larger vista of possibilities in regard not only to silicosis itself but to various other conditions, hitherto unscheduled, which may in the future have to be included in the category of industrial pulmonary disease. In the domain of radiology the table of criteria adopted by the Miners' Phthisis Bureau, and used by the Silicosis Commission, still holds the field as the only official classification. It is, however, recognized that the present X-ray standards are far from adequate, and endeavours are already being made to improve this essential part of the diagnostic machinery.

Of other recognized forms of pneumonoconiosis, that which has received special attention in the last five years is siderosis. The work of Prof. M. Stewart of Leeds on the morbid anatomy and histology of the fibrotic lungs found in the hæmatite miners is of special interest, and must be mentioned as one of the most valuable contributions to our knowledge of these subjects.

NERVOUS DISORDERS

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NARCOLEPSY

FOR some years the most favoured treatment of narcolepsy has consisted in ephedrine, given alone or in combination with caffeine. No one will deny, however, that the results are not altogether satisfactory. Recently the synthetic isomer ephetonin (Merck) has been advocated, in tablets of ½, 1 or 1½ grains, once, twice or thrice daily. A new though allied drug has lately been introduced by M. Prinzmetal and W. Bloomberg.[1] These authors have treated narcoleptics with benzedrine sulphate (benzylmethylcarbinamine), claiming relief not only in the sleep attacks but also in the cataleptic seizures. It appeared that the drug was approximately three to five times as effective as ephedrine in stimulating the nervous system and was correspondingly less toxic. The dosage recommended for adults is three tablets (30 mgm.) after breakfast, three tablets (30 mgm.) after lunch and one to two tablets (10–20 mgm.) in the evening. The last amount is to be reduced or withheld if nocturnal insomnia is produced. Dosage is actually an individual problem and it seems advisable to start with small amounts (10 mgm.) and gradually to increase.

MYASTHENIA GRAVIS

The four new therapeutic measures, namely—prostigmin, glycine, ephedrine and potassium chloride continue to be employed with at least temporary success in this disorder. Of these prostigmin when administered hypodermically usually produces the greatest degree of improvement, though the effect is purely transitory. A practical advance has been made by W. H. Everts[2] who has shown that prostigmin may be beneficial when given by mouth. He recommended that 10 mgm. of prostigmin should be dissolved in 60 minims of distilled water, and that 180 minims of this solution be administered three times daily. In two cases of myasthenia gravis, the results were satisfactory. The oral route proved more gradual in its action than the hypodermic, but lasted longer. Unpleasant side-effects were less frequent and there were none of the extreme fluctuations in the patient's condition which may develop when the drug is given subcutaneously. Simultaneous administration of ephedrine or glycine did not help. Potassium chloride given orally seemed to augment the effect of prostigmin, but the associated gastric derangements and diarrhœa rendered the combination an unsuitable one. L. P. E. Laurent and M. B. Walker[3] have also found prostigmin efficacious by mouth. These writers have moreover used an analogous drug called " substance 36 " (dimethyl-carbamic ester of 8-oxymethyl-quinolinium-methyl-sulphate). Of this latter, a solution was prepared containing 100 mgm. to the ounce. At first 10 mgm. can be given, but the dosage may afterwards be increased. When larger amounts are employed, it is advisable to prescribe at the same time tincture of belladonna, 20 to 30 minims.

MUSCULAR DYSTROPHIES

There is considerably less enthusiasm of late for the employment of glycine in cases of myopathy. No doubt the prestige of the drug has suffered from the doubtful validity of the biochemical rationale on which the drug was originally based. It is illogical, however, to condemn it on these grounds for the clinical effect may still be present, despite the inaccuracy of the theoretical premises. Probably the wisest policy is to adopt still a judicial attitude and to continue to employ glycine as an experimental measure. One interesting development has arisen from the use of this drug; noticing the improvement in the weight and in the appetite of myopathic subjects taking glycine, H. A. Beard[4] has tried amino-acetic acid in otherwise normal persons complaining of anorexia, loss of weight and nervousness. Doses of 10–20 gm. daily were ordered, with water, milk or fruit juices. An increase in weight of from 7–24 lb. was recorded in eight patients over a period of three to twelve weeks. Previous dietetic and drug therapy had in these patients proved ineffectual.

MIGRAINE

The great value of hypodermic injections of ergotamine tartarate (femergin) in cases of migraine has been abundantly confirmed. Attempts have been made with some measure of success to decrease the frequency and severity of the attacks by the regular oral administration of the drug. Thus the proprietary preparation bellergal (Sandoz) consisting in luminal. bellafoline and ergotamine tartarate, has often proved most helpful. S. E. Scholtz, R. M. Brickner, H. A. Riley and L. A. Salmon[5] have also treated a series of migrainous subjects with tablets of 1 mgm. of ergotamine tartarate by mouth twice daily. A series of 43 patients of all ages and both sexes were treated in this way. The results though not dramatic were satisfactory in many subjects. No case of ergotism was found, even though the medicine had been continued more or less continuously for as long as two years in some patients.

PERIPHERAL NEURITIS

For some years clinicians have recognized some possible association between polyneuritis of uncertain type and avitaminosis. I. S. Wechsler[6] was one of the first to draw attention to this problem, but within the last year or two numerous writers have described the treatment with preparations of vitamin B, of cases of polyneuritis, especially those of the gestational and alcoholic types. Thus N. Jolliffe, C. N. Colbert and P. M. Joffe[7], following up the original speculation of G. C. Shattuck[8], produced evidence suggesting that polyneuritis in the alcohol-addict is due to lack of vitamin B. Treatment with oral preparations of vitamin B (e.g. bemax or marmite), has become increasingly popular in all types of peripheral neuritis. Owing to the uncertainty as to the fate of vitamin B when given by the mouth, as emphasized by G. R. Cowgill[9], parenteral preparations are now in vogue (see W. Ritchie Russell[10]). Several firms of manufacturing chemists supply vitamin B concentrates suitable for hypodermic use.

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PSYCHOLOGICAL MEDICINE

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IT cannot be claimed that any outstanding discoveries in the sphere of mental disease have been made in the last few years. At the same time it is possible to record steady progress in many directions. It is especially gratifying to find that the medical profession as a whole is becoming increasingly aware of the devastating effects of mental disease upon the community in this and other countries. The report of the Board of Control for 1935 states that 152,089 patients were being treated in mental hospitals on January 1, 1935. This does not include mental defective institutions or those under guardianship. In addition to patients in mental hospitals there is a vast number of psychoneurotics, psychopathic personalities, obsessionals, hystericals, occupational neurotics, alcohol and drug addicts, kleptomaniacs, and difficult children. Haliday has published recently a statistical investigation which puts the proportion of psychoneurotic disability as one to two. It has also been suggested that the number of people in this country who would benefit by treatment, were it available, has been variously estimated from 3,000,000 upwards.

It must be recognized that every patient sent to a mental hospital means a distressed and anxious family. It is obvious that the commital of a patient on account of mental disease is much more serious in its effects than temporary absence in a nursing home or hospital for bodily illness, as the bread-winner of the family may be permanently incapacitated. Furthermore, the children of psychotic parents are liable to be handicapped when the question of marriage arises. It is probable that the effects of psychopathic and psychoneurotic parents upon the family group are devastating. It is often assumed that when an individual is the product of psychopathic parents any neurosis which he or she develops is due to inborn factors. This assumption may not be altogether justified, because a child who has had the misfortune to be reared by psychopathic parents must necessarily have been the victim of a subtle psychic trauma from the day of his birth. Many individuals do not possess the qualities which entitle them to control others or to gain their love, but succeed in gaining their ends by means of their neurotic symptoms. They dominate by means of preposterous exactions; give meaningless orders without reference to their utility or value; they control, supervise, and interfere with the actions of others; treat the family as children; and require the constant gratification of every whim. In each circumstance the normal members of the family can scarcely fail to exhibit psychoneurotic symptoms under these conditions and unless they are in a position to leave their home which has such an unhealthy environment effect upon them. After this brief outline of the problem of mental disorder and its effects on the community, an endeavour will be made to summarize the methods which are being applied to prevent and alleviate the sufferings of the mentally maladjusted.

THE PSYCHIATRY OF CHILDHOOD

In recent years psychiatrists have taken an increasing interest in maladjusted children. Seven years ago the Child Guidance Council was established " to encourage the provision of skilled treatment for children showing behaviour disturbances and early symptoms of nervous disorder." The London Child Guidance Clinic was established, by the council at Islington in 1929, through the generosity of the Commonwealth Fund, as a centre for the demonstration of child guidance methods. This clinic has contributed much to the progress of the child guidance movement in this country, for besides demonstrating the need for this service, it has become the recognized centre for training psychiatrists, psychologists, and social workers in clinical work with children. The work of the clinic is primarily to advise parents when they are faced with unusual difficulties in dealing with their children. All normal children are difficult at times and the average parent can handle these up and downs quite satisfactorily, but children vary and there are some whose misbehaviour is clearly of deeper origin. The difficulty may depend on something unusual in the child's personality or mode of living which will not respond to ordinary management—some special treatment is needed to set it right. Here the clinic can help and its services are available to parents whose means do not permit them to consult a specialist in private. The methods used are comparatively simple, although they require patience, skill and time.

The whole circumstances of the child must be known if sound advice is to be given—otherwise it is merely guess work. History, development, physical health, mental endowment, educational attainments, habits, and personal characteristics must all be known, for only then is it possible to lay a finger on the real root of the trouble. The changing of a manner of living or a personality is, however, a lengthy process and in many cases the parent, the child and the clinic workers must meet again and again before the troubles can finally be adjusted. Though the child is usually brought for the treatment of one symptom, such as backwardness, bed-wetting or bullying, it always transpires on fuller investigation that this is accompanied by other troubles. The backward child may be walking and talking in his sleep, pilfering and lying to cover himself. The bed-wetter is perhaps anxious, afraid of the dark, shy and train-sick, and the bully is jealous, given to violent tempers or is playing truant and failing in school work. Then it becomes clear that the problem is a real one—that there are disturbances deep down in the child's personality which require adjustment if the symptoms complained of are to be cured. Some are brought because they are failing in school work, but in addition to those in which this failure is recognized, there are many others in whom it is not. Their capacity for success in school has been overlooked and attention has not been drawn to their academic struggles, so often a vital part of their difficulties. Many of the children are of exceptionally high intelligence. These tend to be neurotic and to be assailed with anxieties—abnormal fears and imaginings.

The *treatment* of patients is the principal function of the clinic and the major energies of the staff are devoted to it. Dr. E. Miller[1] has recently discovered that as the result of treatment of retarded children, not only were emotional disturbances diminished, sometimes to a minimum, but that, parallel with this improvement on the affective side, there followed an improvement in application to school work and an improved score in mental tests. In other words, it is permissible to argue that affective disturbances act in an inhibitory way on intellectual output. The series of cases which have been studied are, in the main, illustrations of arrest in the growth of the sense of reality engendered by affective disturbances. In the series under consideration, it was found as the result of study from the psychological, psychiatric, and the social points of view, that the mental arrest was circumstantial; that is to say, circumstances in the early life of the child had produced such affective preoccupation that the cognitive life stagnated because a more satisfactory *modus vivendi* was obtained by regressing to infantile forms of reaction manifested in symptoms, behaviour, and above all, in all unnatural preponderance of magical and animistic reactions to the external world. These latter tendencies were shown not only in behaviour and symptom (for that would be only inferential), but directly from observing the child at play, in drawing, and its soliloquies.

I have not hesitated to outline at some length the measures now being utilized in the treatment of maladjusted children. The complexes of children are in many cases superficial and therefore the outlook for recovery is favourable. On the other hand, if these children are handled badly it is probable that the symptoms will persist throughout life—or at least will require lengthy treatment before a healthy reaction to life is achieved.

PSYCHOTHERAPY IN GENERAL PRACTICE

In recent years family practitioners have taken an increasing interest in the treatment of psychological disorders. In some respects the psychoneurotic patient may benefit more from the treatment by their own doctor than he would from a trained psychotherapist who has no direct personal knowledge of the interactions of the family group. It has been suggested indeed that those who propose to take up psychotherapy would do well to spend some time as a practitioner in order to gain insight into the stresses and sufferings of the patients whom they visit day-by-day. F. Bodman[2], a practitioner in Bristol, states that the common nervous disorders make up a large fraction of the practitioner's daily work. At a conservative estimate 25 per cent. of the patients encountered in general practice, are, in Bodman's experience, suffering from functional disorders. The first problem is to recognize the functional nervous disorder when it presents itself for diagnosis in the consulting-room. This can be sometimes easy and sometimes difficult. When the diagnosis is easy the treatment is often difficult. On the other hand, when the diagnosis has taken an hour there is often no treatment, as the patient is well. Another paradox is that when the patient attributes his illness to some disorder of one of his organs it is often found that he is suffering from a neurosis, and when the patient complains of " nerves " a masked hypothyroidism, a latent hypoglycæmia, or a toxæmia from a hidden septic focus may be suspected. Many somatic discomforts are frequently associated with unconscious emotional conflicts. " D.A.H.," or disordered action of the heart, was a masterly compromise: nothing organic, but the patient was palpitating with fear. Other examples are psychogenic asthma, miners' nystagmus and psychogenetic Menière's syndrome. In dealing with the psychoneurotic Bodman found that a " spot " diagnosis will be denied by the patient. Cure will depend on his working out his own solution, he must *feel* that it is correct. In a number of cases the motives of the neurosis are not difficult to discover. The girl confronted with developing contours and the onset of menstruation dimly comprehends the underlying problem of sex, and, if unprepared, is apt to evade the issue by embarking on a strict diet in the vain hope of arresting the progress of nature, and thus drifts into anorexia nervosa. Anorexia is not uncommon also in women of maturer years, and in almost every case inquiry will establish that the sufferer is faced with an apparently inexorable fate from which she has but little hope of escape and no avenue for expressing her despair. In the male adolescent there are disturbing changes in his physiology which lead to masturbation, and in a number of cases anxiety states occur. They go in for strenuous athletics, make all kinds of fanciful alterations in their diet to avoid stimulation, and follow an ascetic regime of cold baths and long walks, all to no purpose. The occasions for remorse still recur. Most of them live in constant dread of remote but certain consequences of spinal degeneration, of insanity, or loss of virility. Most of Bodman's patients were clerks, not earning enough to be independent of the paternal roof or to afford the pleasure of female society, and subject to the restrictions of a strictly regulated, often nonconformist, household.

Sir W. Langdon-Brown[3] observes that a striking feature of twentieth century medicine is a return to the cult of Æsculapius :—Cleanliness, fresh air, suggestion, dream analysis, and psychological explanation. These were the cardinal tenets of the cult, and it is a striking fact that all of them were lost by medicine until quite recent times. This modern return to Æsculapius is a recognition of the importance not only of the disease which the patient has, but of the patient who has the disease—his reactions as an individual, his environment, and his hereditary trends. The old adage " examine the whole of your patient " thus assumes a new meaning. It is by the combined attack on the physical and psychological side that medicine in the future will make advances and still further aid human suffering.

Every patient who consults a doctor is in a state of fear. He is thereby rendered more suggestible, and the attitude of the doctor, whether encouraging or the reverse, can profoundly affect his autonomic nervous system through his emotions, and thereby practically every chemical reaction throughout his body may be modified. Herein is the scientific explanation of the fact that the best of tonics is hope. But an essential factor in hope is faith. The patient must believe in the doctor, in his knowledge, care and skill. The doctor will have to give good grounds for his faith, and in order to inspire it no aspect of the case must be neglected. Organic disease is not so common as is often supposed. Langdon-Brown states that he has asked various practitioners what proportion of the patients they see are suffering from functional rather than organic disease; not one of them placed it at less than 40 per cent., and some put it as high as 75 per cent. That is to say, about half to three-quarters of these patients, were, broadly speaking, finding difficulty in adapting themselves to their environment. Their trouble might be due to environment, but it might be due to themselves. A disturbing emotion will cause palpitations and a sinking sensation in the stomach. The normal person recognizes this for what it is worth; the psychoneurotic concludes that he has heart disease or a gastric ulcer. This enables him to fulfil his subconscious or unconscious desire to retreat from life and evade his duty as a member of the social organism.

It is now being increasingly realized by the medical practitioner that the individual must be regarded "as a whole". The psychiatrist cannot neglect the physical side of his patient, and it is equally true that the physician cannot afford to ignore the psychological side of those who are physically ill. Dr. Hendrick, an American psychoanalyst, has suggested indeed that psychological treatment may be beneficial in the treatment of bodily disease. He states that incidental observations during the analysis of psychoneuroses have frequently shown the possibility of definite therapeutic effects on *incidental* organic processes. All degrees of chronic and intermittent *constipation* are regularly relieved during analysis, as a result of the better functioning of the total organism, without special attention to these symptoms. Less regularly, but not infrequently, similar cures of other minor ailments of the gastro-intestinal tract occur. More frequent still are the cures of a number of troublesome *disorders of menstruation,* coincidentally with the relief of the emotional difficulties of female psycho-sexuality. A therapeutic effect on a number of other common complaints is also frequently observed, such as various *rashes,* and *dermatitides, constant colds, headaches,* and *functional polyuria.* At the very least these observations once more serve to emphasize the intimate relationship between mind and matter.

PSYCHOLOGICAL CLINICS

In recent years a number of psychological clinics have been established for the treatment of psychoneurotic patients. These clinics serve two purposes—the training of members of the medical profession who wish to gain some knowledge of the treatment of patients, and also to treat patients who are unable to afford the expense involved in private consultation. These clinics have been very successful and have met a definite need. Amongst these clinics are the Maudsley Hospital, the Institute of Medical Psychology and the London Clinic. Dr. Margaret Lowenfeld, co-director of the Institute of Child Psychology has made a number of interesting studies of normal and abnormal children. In addition numerous psychological clinics have been established in various parts of the country. It may be of some interest to note that Dr. Bevan Lewis, the medical superintendent of The Wakefield Mental Hospital, was the first to establish an outdoor clinic in a County Asylum. The value of these clinics cannot be over-estimated and they have met a definite need.

RESEARCH IN MENTAL DISEASE

In spite of many researches on the pathology of the biogenetic psychoses the disorder remains extremely obscure. Psychotic patients frequently recover but it is not known what happens in the organism when the patient gets well. No doubt physical treatment, occupation therapy, and psychological talks do much to stimulate recovery but, as in physical disorders, the organism must play its part when mental health is restored. In view, therefore, of the urgency of the problem of the psychoses more research work is needed. Medical research in this country owes much to American support. Of late years help has been drawn from the United States not only in money, but in inspiration, and nowhere has this inspiration been more valuable than in neurology and psychiatry. It is with gratitude that further gifts by the Rockefeller Foundation can be recorded, which will substantially improve facilities for work on these subjects in London. The fruits of the scientific liaison with America are well seen at the Maudsley Hospital which benefits by a new Rockefeller gift. Eight of the practitioners who have been on the staff of this hospital have enjoyed the advantages of a travelling fellowship of the Rockefeller Foundation, and four others have had corresponding opportunities for study abroad made available to them by the Commonwealth Fund of America. It is not only in the furtherance of child psychiatry and social psychiatry in this country that the Commonwealth Fund has played a notable part, but also its generous support of investigations in adult psychiatry. It has maintained at the Maudsley Hospital during the last four years no less than seven full-time research workers for periods of at least a year. Besides these grants, the hospital has had the Maudsley bequest, devoted to like purposes, and the assistance of the Medical Research Council. In addition the Foundation has established five research posts, four of them to be allocated to biochemists who have held important appointments in Germany. At the conclusion of his presidential address at the Royal Society of Medicine, Dr. F. L. Golla[4] observed that he looked forward to a day when a neurologist will be a humanist in the widest sense, when the psychiatrist will no longer shun the laboratory, and the neurophysiologist will be the trusted collaborator with the psychologist. In other words, the individual " as a whole " must always be visualized.

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RHEUMATIC DISEASES

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IN this survey it is not proposed to deal with acute rheumatism or rheumatic fever except in so far as the borderline between it and the more acute forms of infective (rheumatoid) arthritis is concerned. The definite division which is generally supposed to exist between the conditions tends to become less defined as investigation into etiology proceeds and the study of etiology is essential in the scientific approach to treatment. Either condition may be preceded by acute focal sepsis, such as septic tonsillitis or quinsy, and hæmolytic streptococci are equally incriminated in both forms though the exact part they play in etiology is not yet clear. That the soil as well as the seed must be taken into consideration is certain and attention has been directed to this factor in recent researches. There are undoubtedly factors at work which determine whether the infective agent on entering the system will be destroyed or remain latent or give rise to a pathological condition; they will also determine the form which it takes. Viruses have been claimed to play a part, Schlesinger and Eagles having reported investigations in this direction. The view that the tissue cells may be rendered sensitive to attack by invading micro-organisms by the action of other microbes or their toxins, derived it may be from an existing septic focus, is generally accepted and in the absence of such sensitization the subject remains immune. Sensitization may, it would seem, be the result of hereditary or congenital influences or of the action of saprophytic organisms. That saprophytes may themselves become pathogenic in the presence of sensitization or other influences seems probable and that the *Bacillus coli* may become pathogenic is certain, and it has recently been incriminated in the etiology of arthritis. The *Streptococcus viridans* has occasionally been isolated from the blood in cases of chronic arthritis and is more frequently found in septic foci, such as teeth and tonsils, than perhaps any other microbe; but the view forcibly expressed by a French authority that this streptococcus is merely "a common saprophyte" is becoming generally accepted. This view makes the term "autogenous" misleading when applied to vaccines of this microbe. The problem is further complicated by recent researches of which that of Burbank and Hadjopoulos may be cited, which seem to indicate the possibility of mutation from diphtheroids—through staphylococci and tetragenus to streptococci and they suggest that these are phases in the life history of the hæmolytic streptococci.

Much work has been done, especially in America, upon serological reactions to various strains of streptococci. Following upon the work of Nicholls and Stainsby in 1931 showing that the sera of patients with rheumatoid arthritis agglutinated certain strains of hæmolytic streptococci cultured from patients suffering with the disease, Dawson and Olmstead showed that "significant agglutination reactions are obtained only when hæmolytic streptococci of Group A (Lancefield) are employed as antigens." Although this appears to indicate that this strain of streptococcus plays a part in the etiology of rheumatoid arthritis, it has yet to be proved whether this is primary or only of secondary importance. McEwen and his associates found this agglutination positive in 86 per cent. of cases of rheumatoid arthritis as compared with only 5 per cent. in rheumatic fever with polyarthritis.

Todd, Griffiths and Goldie have done important work in this country upon the anti-hæmolysins and also upon intradermal reactions in rheumatoid arthritis and agree with American workers in finding the anti-hæmolysin titre substantially higher in rheumatic fever than in rheumatoid arthritis. It seems evident that the hæmolytic streptococcus is a factor of importance in both diseases but that there are modifying influences at present imperfectly understood. Griffiths has reported work upon the exotoxins and endotoxins of the streptococci and the effect of an extract containing both as an antigen for use in treatment.

Dawson discusses fully the differences between acute rheumatism and acute rheumatoid arthritis upon which diagnosis and treatment may depend. He refers to cases of chronic joint deformity following rheumatic fever of which Fischer reports 202 cases and Freund 110 occurring in their personal experience. Such cases are in Dawson's opinion rare in the United States. The writer has formed the opinion that such cases are definitely more common in the north of Great Britain than in the south, which supports the idea that climate exercises an influence in a way hitherto unsuspected. In view of the age incidence and the clinical manifestations at different periods as well as climatic differences, it would seem probable that tissue sensitivity to the same infecting agent may vary both in degree and character, with age and other modifying circumstances, and that the differences between the two diseases may thus be explained.

The French hold that the tubercle bacillus in an attenuated form is the cause of some cases of chronic arthritis indistinguishable clinically from the rest. Their belief is that this may occur in individuals who have lived in close association with sufferers from tuberculosis in a more active form, and who may have harboured the bacillus in the glands or elsewhere for a long time; Copeman has recently published a series of cases of arthritis in which the tubercle bacillus appeared to play a part. It is possible that in such cases the tuberculous toxin has acted as a sensitizing agent and rendered the tissues susceptible to the attack of other infective agents or that septic teeth, tonsils or other foci may have supplied the sensitizing agent rendering the joints, previously resistant to the tubercle bacillus, ultimately open to attack. Since, however, these types of chronic arthritis do not call for any different treatment from that suited to other cases the problem does not appear at present to have any important bearing on the management of the disease.

TREATMENT

Chrysotherapy or treatment by salts of gold has received much attention during the last two or three years. This was first practised by J. Forestier in 1928. Recognizing that the principles and methods of treatment which had proved successful in tuberculosis were of value in rheumatoid arthritis, he determined to try gold salts which had been extensively used for phthisis with results which were on the whole encouraging. In 1934 he reported his experience in the treatment of 500 cases of various types. He found it was of most value in the rheumatoid type not due to a known specific organism such as the gonococcus. In his experience as well as that of others it has proved of no service in osteoarthritis of degenerative origin. In this country results have been published by Pemberton, Slot and Deville, Hartfall and Garland among others, and the latter as well as Geoffrey Holmes have reported unfavourable results in some cases. There have also been reports in the lay press of inquests in cases in which death has followed the use of gold in treatment, though these occurred mainly before the dangers were recognized and the necessary precautions taken. Much larger doses have been used in tuberculosis than appear to be tolerated by most arthritics, but unfavourable results were recorded sufficiently often to stress the need for the most meticulous care in its use.

The preparations most used are sanocrysin and crisalbine, inorganic salts, generally given by the intravenous method, allochrysine, solganal B and myocrisin which are organic compounds administered intramuscularly. Both oily and watery solutions of the last two are used. It is claimed that the oily solutions are more slowly and uniformly absorbed but on the other hand the risk of cumulative action is greater and in my experience the watery solutions in small doses are easier to control and therefore freer from risk of overdosage. It is desirable that a chart of the temperature should be kept; a slight rise is not uncommon after an injection and in such a case the next dose should not be increased. Other symptoms of intolerance are pruritus and skin rashes, scarlatiniform, morbilliform, or urticarial, or even dermatitis exfoliativa of severe and intractable type : stomatitis with ulceration which may be obstinate to treatment; and albuminuria. Hæmorrhages have been met with from the alimentary or renal tract. These were commoner with the intravenous use of the inorganic salts in tuberculosis in the earlier days and are associated apparently with thrombopenia. Bronchial catarrh has also been recorded with solganal B but follows a benign course clearing up quickly and completely. In one or two instances agranulocytosis has followed the use of gold and has apparently been due to it.

These unfavourable effects may be the result of idiosyncracy and appear with the first dose even though it be small and are an indication that the remedy should not be tried further. On the other hand they may appear after several doses have been given and indicate that the limit of tolerance has been reached. Various methods have been tried to prevent these unfavourable developments. German authors have advocated the simultaneous administration of glucose, but others have not found this of any effect. H. J. Williams gives calcium gluconate in combination with allochrysine and finds this method permits the use of larger doses and for a longer course than otherwise. His method, based on the experience of Mayer, is a very useful contribution to the technique.

For the treatment of the skin symptoms Forestier advises hyposulphite of sodium in doses of 10 to 20 c.cm. of a 10 to 20 per cent. solution by the intravenous route. Liver has also been tried with good effect and is beneficial in other ways in many cases of arthritis.

Opinion appears generally to be trending towards an initial dose of 0·01 gm. increased gradually at intervals of five to seven days until 0·1 gm. is reached and this dose is continued until a total amount of 1 gm. or a little more has been given when an interval of six or eight weeks is allowed to elapse before the course is repeated.

Some improvement, especially in the lessening of the pain, may be experienced in the first course, but often there is no notable change until the second or third course has been completed. The gradual return of the sedimentation rate towards normal is one of the most striking objective evidences of the beneficial effect of the remedy. This should be taken before beginning for cases in which the rate is normal are not likely to benefit by the use of gold. Blood counts are also desirable from time to time and any diminution in white cells or platelets demands serious consideration. That chrysotherapy is an important and valuable addition to the available resources in dealing with rheumatoid arthritis appears to be proved; but it demands the greatest care and unremitting attention to detail if success is to be attained and unfavourable results avoided.

Rest.—Many writers have recently called attention to the importance of rest in the management of arthritis. The popular idea that arthritics must be kept on the move lest the joints become " set " has been responsible for much unnecessary suffering and it has been the cause of more crippling than it has prevented. Rest of individual joints by means of light splints, with gentle movement once daily through the fullest possible range, actively wherever possible, is the soundest practice. The importance of rest as part of the treatment is not limited to the joints; the indications are constitutional in many cases. Pemberton reported a series of 300 cases treated by rest in which it proved so effective that in a large proportion no other treatment beyond suitable diet and measures to prevent deformity were required. Rest in bed is not to be regarded as indicated in febrile conditions alone, for many patients are in a state of physical and mental exhaustion and present a subnormal temperature and in such cases a rest of weeks or even months in bed may prove to be the foundation of successful treatment provided that due attention is given to appropriate diet, the control of constipation, maintenance of the condition of muscles, and light splinting when required to prevent deformities developing in the affected joints. Treatment of other kinds can readily be combined with rest and will often prove more effective thus. A warning note must, however, be sounded; under no circumstances must the daily movement of the joints be neglected and this must gradually be increased. The period of rest in bed must also not be too prolonged. Massage of the muscles and hydrotherapy are useful in combination with rest.

Artificial hyperpyrexia.—Fever therapy has lately received a good deal of attention and many workers have reported results. Various methods have been tried, the principal being the use of vaccines and other substances by injection to produce protein shock, diathermy, the use of air-conditioned hot-air cabinets, radiotherapy and hot baths. That this method is the most effective that has yet been devised for the treatment of gonococcal arthritis seems certain, but to avoid dangerous reaction and to secure the best results treatment in hospital by nurses trained in the method under the supervision of a physician appears to be very desirable. Of 151 cases of gonococcal arthritis treated by this method collected from various sources by Hench 80 per cent. have apparently been cured and an additional 10 per cent. markedly relieved. The results in acute and chronic infective arthritis of the rheumatoid type are much less satisfactory. Hench reports 315 patients thus treated in different clinics: 5 per cent. became free from symptom, 25 per cent. were markedly relieved and the remainder received little or no benefit. Nicholls, Hansson and Stainsby after a trial in 12 cases concluded that it was a trying ordeal for the patient and did not feel justified in continuing it. For details of technique the very extensive American literature must be consulted. The effects of prolonged hyperpyrexia are manifold, changes in the flow and chemical composition of the blood and in the metabolic rate are among the more obvious. The bacteriolytic action may be the most important as thermal death-point of the gonococcus is relatively low and it is killed by five to seventeen hours of fever at 106–7° F. This temperature can be tolerated by most patients and may be given by two to six sessions of fever at 106–107°F. for five to six hours, but it appears to be insufficient to destroy the streptococci. Like many other valuable therapeutic procedures it is not without danger and fatal cases have been recorded. It is interesting to note, however, that the method has been used with success in chorea. Sutton and Dodge have reported 300 cases of children with chorea of whom 150 were treated by a typhoid-paratyphoid vaccine and 150 by drugs, rest and physiotherapy. The average duration of the disease in days with the former group was 8·5 and in the latter 42·6. Active carditis was present in 16 and did not prove a contra-indication but on the other hand appears to have benefited from the treatment. Byrne in a personal communication to the writer recorded equally favourable results in a smaller number of cases. In view of the fact that hyperpyrexia has hitherto been regarded as one of the graver complications of acute rheumatism these results are remarkable and call for further study.

Histamine has recently been employed extensively in a number of rheumatic conditions. Its use was first reported by Deutsch in 1931 and later Kling reported 554 cases of various kinds so treated with a high percentage of good results. It may be used by cataphoresis, inunction of ointments or injection. Histamine is known to act upon the arterioles and capillaries, causing dilatation and flushing and thus may exercise a favourable effect upon the defective capillary circulation in rheumatoid arthritis and is also likely to improve the circulation and thus the venous and lymphatic drainage in fibrositis. The most convenient method of securing the local effects is by cataphoresis which rapidly induces flushing and wheal formation at the positive electrode and, if continued, severe headache and general symptoms ensue. The effect is temporary and should be followed by methods adapted to take advantage of the effects produced, massage and exercises. I have found it of most service in recent fibrositis especially of the shoulder and in early stages of rheumatoid arthritis. It has the advantage of being easy of application in the conditions of general practice and a specially prepared foil called "katexon" may be obtained for the purpose. There is some reason to believe that physiotherapeutic methods may owe something of their effect to the liberation of such substances as histamine and choline compounds by the tissue cells when stimulated or subjected to minor forms of trauma.

Sympathectomy has been tried in arthritis with varying effects, the best results being obtained in very early cases with markedly deficient capillary tone.

Vaccines.—The trend of recent work on vaccine therapy has been rather to discourage their use than otherwise. In the large or comparatively large doses formerly used the action appears to be of the nature of protein shock and not specific, with all the risks of that method often intensified by the administration of the vaccines over much longer periods than when other methods of inducing protein shock are used. Modern practice favours the use of very small doses avoiding any reaction, the effect when used in this way being desensitizing rather than immunizing. Such dosage has the advantage that it is generally free from risk: the intravenous route appears best for this purpose.

Bee venom.—The general belief that persons who keep bees and have frequently been stung are immune from rheumatic disease has led to this being tried as a method of treatment and good results have been claimed. Special preparations of bee toxin are prepared and marketed for the purpose. The mode of administration is by intradermal injection. Comparatively little has been published on this method in this country and it would appear so far as present knowledge goes, to be merely an additional method of obtaining non-specific desensitization by means of foreign protein. It is definitely useful in fibrositis.

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TROPICAL DISEASES

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VALUABLE tropical research work has been reported in the last year, but much of it—especially that dealing with filterable viruses, rickettsial infections and bacterial diseases—has not been concerned primarily with either diagnosis or treatment. In the protozoal and helminthic infestations, on the other hand, specific chemotherapy has proved more successful, and for this reason, attention is specially devoted to these diseases in the present review.

HEAT STROKE

Lee[1] has analysed the type of physiological breakdown and the clinical syndromes which may result from failure of man to adapt himself to hot climates. Four chief crises were recognized, namely, (1) hyperpyrexia with rapid rise of temperature and profound nervous disturbances; (2) circulatory insufficiency producing heat exhaustion; (3) electrolyte unbalance leading to hypochloræmia, cramps and tetany; (4) dehydration with reduced salivary secretion, thirst, oliguria, acidosis and finally uræmia. Clinically, most cases displayed symptoms characteristic of more than one syndrome. Treatment included evaporative cooling for hyperpyrexia, intravenous injections of saline solution for heat-exhaustion and dehydration, and adequate chloride intake for heat-cramps. It was recommended that for prophylactic purposes the daily excretion of sodium chloride should not be allowed to fall below 3 gm. per day.

PELLAGRA

Spies[2] has pointed out that pellagra is generally attributed to lack of some specific chemical substance present in the food and that the mortality is high, especially in alcoholic pellagrins whom he was treating. By measures to be described the mortality was reduced from 54 per cent. (73 cases) to 6 per cent. (125 cases). These included adequate rest in bed, sedatives, careful nursing, a well-balanced diet of 4,000 calories or more each day and treatment with specific anti-pellagrous materials like yeast, wheat germ, ventriculin, or liver extract in large quantities. Food lost by vomiting or diarrhœa had to be made up. Brewers' yeast (75 to 100 gm. daily) or wheat germ (255 to 300 gm. daily) were given in iced milk or iced egg nog. Ventriculin was administered in a dosage of 200 gm : it possessed the advantage over brewers' yeast of not causing diarrhœa. Liver per os in a dosage of 75 to 100 gm. daily rapidly cured the majority of patients, but in intractable cases with persisting diarrhœa and severe vomiting 3 to 5 parenteral injections of liver extract (20 c.cm. each) were advocated daily, combined with large amounts of specific anti-pellagrous materials by the mouth.

TROPICAL SPRUE

Castle, Rhoads, Lawson and Payne[3] in Porto Rico found sprue patients were living on a diet deficient in sources of extrinsic factor, such as meat, eggs and whole cereals, and attributed the disease to this deficiency. Liver extract administered orally was relatively ineffective, but on parenteral injection it favourably affected the formation of blood and invariably benefited the tongue manifestations and the alimentary condition. Dietary was not considered important from a therapeutic viewpoint. Fairley[4], on the other hand, dealing with patients from India, Malaya, China and other parts of the world, found that at the time they developed sprue they had been living on a diet which compared favourably in its protein content with that taken in Europe and included an abundance of eggs and red meat as well as vegetables and fruit. Furthermore, provided appropriate high-protein, low-fat, low-carbohydrate diets were instituted, the relative efficacy of liver extract, given orally or parenterally, appeared to be essentially a question of dosage. In those rare instances in which an inadequate hæmatological response followed administration of liver by mouth, parenteral injections were effective only in a correspondingly larger dosage. In the absence of complications, appropriately treated cases of tropical sprue invariably recovered. Biochemical investigations showed that a high fæcal fat, a low total serum calcium, and a flat type of oral glucose curve were characteristic of the disease. Defective absorption of fat, glucose, calcium and vitamins and defective secretion of intrinsic factor accounted for the clinical picture, but the cause of the alimentary dysfunction has yet to be discovered.

PARALYTIC RABIES

Since 1931, when Pawan discovered Negri bodies in the brains of animals, human beings and bats in Trinidad, it has been ascertained that the blood-lapping bat, *Desmodus rotundus*, transmits paralytic rabies to both animals and man there. Verteuil and Urich[5] suggest that some modified virus of rabies may be responsible, and deal with certain points of diagnostic interest in man, differentiating paralytic from ordinary rabies. These include an incubation period of three to four weeks following the bat bite, an initial fever of two or three days' duration associated with paræsthesias and paresis of the bitten limb, a longer illness and the absence of maniacal excitement, hydrophobia and general muscular spasm. With lower extremity lesions urinary retention, abdominal distension, constipation and bilateral paralysis ensued, and as the infection extended up the cord, salivation and paresis of the upper limbs supervened. In bites on the upper extremity there might be neither incontinence of urine and fæces nor involvement of the lower extremities. The point of entry of the virus in the body obviously modified the clinical picture, for typical hydrophobia sometimes supervened when the bat bite was on the face or forehead, but not otherwise. Once patients developed symptoms death invariably followed.

UNDULANT FEVER

Wilson[6] reports human infections with *Brucella melitensis* and *Brucella abortus* in Tanganyika Territory. Clinically, intermittent fever, headache, muscular weakness, cramps in the legs, and numbness and burning pains in the joints were characteristic. Diagnosis was made by the usual agglutination reactions and blood cultures, but it is interesting to note that a human strain of *Br. abortus* was isolated which required no increase of CO_2 tension for the primary culture. Treatment with trypaflavine, Bayer "205," and novarsenobillon failed; but good results followed protein-shock therapy (T.A.B. vaccine) on two occasions. Brown and Broom[7] suggest that T.A.B. vaccine intravenously increases the euglobulin content of the serum and thus promotes phagocytosis of Brucella organisms.

YAWS

Several papers published during the last year deal with the relationship of yaws and syphilis, Butler[8] reiterating his contention that yaws so-called is syphilis acquired usually by innocent contact. Hudson[9] describes eight cases of juxta-articular nodes in Euphrates Arabs with syphilis which were indistinguishable, both pathologically and clinically, from those of yaws. Sabre-tibia is associated with yaws in countries where this disease is endemic, and Hackett[10] now establishes a causal relationship between boomerang leg in Australian aborigines and yaws. The radiographic appearances are of considerable clinical interest; the absence of periosteal reaction and bony atrophy differentiates the condition from congenital syphilis in childhood.

LEPTOSPIROSIS (WEIL'S DISEASE)

Cases of leptospirosis were reported by Massias[11] and others from Cochin China, and instances of leptospiral meningitis in adults were recorded by Mollaret and Erber[12], and in children by Marie and Gabriel.[13] The latter observers point out that this disease is probably more widespread than is generally realized, and suggest that in acute meningitis with or without jaundice agglutination tests and inoculation of guinea-pigs with blood and urine should be carried out. Antibodies may be absent in the cerebrospinal fluid when meningitic features are present and cytological exudate is variable in its incidence. Uhlenhuth and Zimmermann[14] find that human convalescent serum reaches its highest titre thirty to fifty days after the beginning of an attack, that it should be given intramuscularly in a dosage of 30 to 40 c.cm., and that it should have an agglutination and lysis titre of at least 1 in 20,000 for treatment of human cases of Weil's disease. It deteriorates when stored and after six months should not be used.

MALARIA

Status of Plasmodium ovale : Giovannola[15] has made a critical survey of cases of *P. ovale* infection and concluded there was not enough proof to establish it as a fourth human species of malaria parasite. James, Nicol and Shute,[16] in reply, have pointed out, amongst other things, that this parasite not only differs morphologically both in the peripheral blood of man and in infected mosquitoes from the other three species, but that the clinical course of the first attack also differs. Wilson and Wilson[17] reported twenty-seven new cases of this infection in Northern Tanganyika. None of the patients was severely ill clinically.

New synthetic drugs.—Schulemann[18] has compared the chemical formulæ of atebrin, plasmoquine, and quinine and advocated combinations of these specific drugs in the treatment of malaria. Plasmoquine (0·01 gm.) combined with quinine bisulphate (0·3 gm.) in the form of quino-plasmoquine was recommended, the dosage being three to four tablets daily for two to three weeks. Atebrin, if combined with plasmoquine, was liable to cause pain in the abdomen. He therefore advocated atebrin, 0·1 gm. thrice daily after food for five to seven days, followed three days later by a course of 0·03 gm. of plasmoquine daily for three to five days.

Several important papers have appeared dealing with the great epidemic of malaria which swept through large areas of Ceylon in 1934 to 1935, and resulted in 80,000 deaths within seven months. Early in the epidemic Blaze and Simeons[19] treated twenty-one cases of malaria successfully with atebrin musonate, 0·375 gm. being given intramuscularly on two successive days. They reported that the injections were painless, unassociated with toxic features, and caused the disappearance of asexual benign and malignant tertian parasites within four days.

Later, Briercliffe[20] analyzed the results obtained by similar treatment with atebrin musonate in a series of 681 patients, and compared the results with another series of 424 patients treated with two intramuscular injections of quinine bihydrochloride (15 grains) followed by quinine per os. He concluded that in epidemic malaria injections were not generally necessary, but if they were, quinine was preferable and safer than atebrin musonate. Pain at the site of injection, abscess formation and toxic cerebral symptoms sometimes followed, and in rather more than 1 in 200 patients death was directly attributed to the drug itself. It proved specially unsuitable in pregnancy and for small children who were prone to collapse and convulsions following its administration. Somasundram[21] also found atebrin musonate toxic in certain cases, and concluded that the therapeutic effects were in no way superior to quinine. Dunn[22] likewise has reported that neither atebrin musonate nor atebrin hydrochloride could take the place of quinine, which in the vast majority of cases resulted in clinical cure. Gill[23] has suggested that owing to food shortage and lowered resistance of the populace the therapeutic value of such a drug during the Ceylon epidemic could not be assessed.

In Africa, Carman and Cormack[24] gave intramuscular injections of 0·375 gm. of atebrin musonate daily for three or four days and observed no toxic symptoms in nineteen natives with malignant tertian malaria. Pernicious symptoms were relieved as readily as by parenteral quinine and convalescence was definitely shorter. For patients able to bear the expense they believe atebrin musonate to be a strong rival to either quinine or oral atebrin.

Blackwater fever.—Nothing published during the period under review challenged the well-established relationship between blackwater fever and malignant tertian malaria. Several cases were recorded in black children. Naumann,[25] Hauer[26] and Corman[27] independently report the value of atebrin in controlling the malarial factor in blackwater fever patients, and of campolon injections in stimulating blood regeneration and exerting a specific action on liver function.

TRYPANOSOMIASIS

During the past seven years Yorke and Murgatroyd[28] have been examining the trypanocidal activity of numerous new arsenical compounds recently prepared in Professor Morgan's laboratory for the chemotherapy committee of the Medical Research Council. The one finally selected was neocryl. This new drug compares favourably with tryparsamide in experimentally infected animals, is less toxic and has a somewhat greater trypanocidal activity. It is well tolerated in man, the suggested dose being 2 to 4 gm. given intravenously once a week for a period of nine or ten weeks (total course=30 to 36 gm.). It exerts a definite therapeutic action in primary, secondary and tertiary syphilis, and ten out of eleven cases of Nigerian sleeping sickness receiving a single course became clinically normal. Visual disturbances were not encountered, the only toxic symptoms being occasional nausea and vomiting, and mild arsenical dermatitis in two cases. An extensive trial of the new drug is to be made. Van den Branden and Applemans[29] found ocular complications 24 times in 118 cases of sleeping sickness treated with tryparsamide in the second stage, i.e. when the central nervous system was implicated. Such accidents are serious since both eyes are involved, the lesions are only partially recoverable and blindness from optic atrophy frequently results. Optic nerve degeneration is more frequent the greater the changes in the cerebrospinal fluid, and the authors attribute it to the effect of tryparsamide on optic nerves already damaged by a trypanosome infection involving the central nervous system.

AMŒBIASIS

In the recognition of amœbic infection of the bowel, Wilkinson[30] has confirmed the importance of examining fresh specimens of stool, and Chang, Ch'en and Chou[31] the value of sigmoidoscopy in diagnosis. In Chang's series of active amœbic colitis cases only 51 per cent. were found by laboratory examination of the fæces, whilst in the remaining 49 per cent. diagnosis was made with the sigmoidoscope. Repeated examinations of the stools were often necessary and in two instances positive results were recorded only in the fifteenth specimen. Chopra, Sen, and Sen[32] have reviewed the results of drug treatment in chronic intestinal amœbiasis and concluded that most drugs were disappointing. Emetine, though effective in the acute stage, had proved too toxic to be given in sufficient quantity to cure chronic infections. Yatren, treparsol and stovarsol were often ineffective. Carbarsone, however, has proved efficacious, being less toxic than stovarsol and possessing a therapeutic index eight times as great. The results obtained with amibiarson, a new compound, chemically allied to carbarsone (4-carbamine phenyl arsenic acid) are proving almost as promising.

Toxic effects resulting from different specific remedies were recorded in several papers. Sayid[33] reported two cases of severe auricular fibrillation following subcutaneous injections of emetine hydrochloride for amœbiasis, and Epstein[34] one fatal case of acute fatty degeneration of the liver and exfoliative dermatitis following the usual course of carbarsone, i.e. 5 gm. in ten days.

In regard to liver abscess, Huard, Renucci and Huynh-tan-Doi[35] point out that even in the tropics and subtropics agents other than *Entamœba histolytica* may need consideration in the differential diagnosis. Instances are cited which include secondary streptococcal infection of amœbic abscesses, multiple staphylococcal abscesses associated with staphylococcal pyæmia, and hepatic abscess in ascariasis and melioidosis due to *Ascaris lumbricoides* and *Pfeifferia whitmori* respectively.

ANKYLOSTOMIASIS

Wickramasuriya[36] stresses the grave risk of hookworm disease in pregnancy in Colombo for both mother and child, and in this series attributes 27 per cent. of deaths in mothers and 23 per cent. of stillbirths to this cause. About 90 per cent. of infected cases showed albuminuria and œdema in the last half of pregnancy, and fatal complications, including heart failure, were not uncommon. When the hæmoglobin fell to 40 per cent. renal function became defective.

Lane,[37] in a critical review of hookworm-killing drugs, points out that in one patient a few worms may give rise to severe symptoms, whereas in another ten times as many may not. De-worming should therefore be complete. The most important drugs for this purpose are oil of chenopodium, thymol, carbon tetrachloride and tetrachlorethylene. Thymol is regarded as the safest and most efficient drug, provided it is mixed with an adequate quantity of milk sugar to prevent agglomeration of the crystals. Two courses of 40 grains each result in de-worming in about 50 per cent. of adults. The new drug tetrachlorethylene employed by Garrison is regarded as promising.

ONCOCERCIASIS

Bryant[38] describes two conditions due to *Oncocerca volvulus* which produce blindness in the Sudan. The first, punctate keratitis, is associated with microfilariæ in the anterior chamber; the second, retinochoroiditis, is associated with demonstrable oncocerca nodules in 58 per cent. of cases. As noted by Hissette, oncocerca tumours of the head are especially apt to be associated with ocular manifestations.

SCHISTOSOMIASIS

Andrewes[39] reports that in infections with *S. japonicum* the technique of hatching out of a miracidia by the method of Faust and Meleney is best for diagnosis. Out of 76 cases positive with this method, examination of smears of the fæces revealed ova in only 29 instances. Khalil[40] has compared the relative values of potassium antimony tartrate and fouadin in the treatment of schistosomiasis. He emphasized the danger of using solutions of tartar emetic not freshly prepared, its proclivity to produce local thrombosis and sloughing of the tissues if any escaped during intravenous injection and its toxic effects. The latter included cough, nausea, vomiting, fever, muscular pains, herpes and dermatitis. Contra-indications to its use were fever, cardiac failure and nephritis. Analysis of 1,000 cases showed that cure with tartar emetic was obtained in 89·4 per cent. provided a full course was given. The percentage cured with fouadin in cases receiving a full course of 13 injections was 84·0 in a series of 3,302 cases. The percentage relapsing after one month was 12·92.

In the treatment of *S. japonicum* Li and Thompson[41] suggest that potassium antimony tartrate properly used is the most efficacious drug. Cure is not attained until the local symptoms have disappeared, the general health has improved, ova have disappeared from the excreta for at least two years, the eosinophile percentage returns to normal, and Fairley's complement-fixation reaction has become negative.

HETEROPHYIADIASIS

Three most interesting cases of cardiac heterophyiadiasis were described by Africa, de Leon and Garcia[42] in which there was sclerosis of the mitral valve and chronic lesions of the myocardium associated with the local deposition of heterophid ova. In another case[43] similar ova were found in the brain associated with a fatal hæmorrhage in the right basal ganglia. The authors point out that as the eggs of these flukes are only one-third to one-sixth the size of schistosome ova, their widespread distribution throughout the body might be anticipated. The possibility of heterophid infestation of the nervous system undoubtedly calls for future study.

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ACUTE INFECTIOUS DISEASES

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IT is an invidious task to decide which advances in the diagnosis and treatment of the acute infectious diseases during the past year are worthy of notice and which may be disregarded. Much more than a year is required for other workers in the same field to examine and repeat investigations which break entirely fresh ground. For this reason experiments, not necessarily new in themselves but furnishing additional or decisive proof of the validity of previous researches, are deemed worthy of inclusion in this review. The recent trend of the treatment and control of the acute infectious diseases involves the conception of regarding members of the community not so much as patients as the potential victims of infective processes. The endeavour so to alter the natural soil that the seeds of disease, far from destroying it, shall actually improve its quality, is the aim of modern prophylaxis. Its bearing on the different aspects of treatment, whether specific or empirical, deserves more than passing mention.

TYPHOID FEVER

Diagnosis.—In the diagnosis of typhoid fever little that is new has come to light in the past year. Increasing experience has convinced serologists of the value of the Weil-Felix modification in certain cases in which the ordinary Widal test is negative or equivocal. The discovery that a fair number of cases of clinical typhoid fever may fail to agglutinate H or flagellar antigen, but give a positive reaction with O or somatic antigen, has increased the range of the test, while the fact that anti-typhoid vaccination produces H agglutinins and the presence of O agglutinins usually indicates clinical attack has greatly extended its usefulness in establishing a diagnosis.

Treatment.—Specific antisera have been used in the treatment of typhoid fever at various times, but the clinical results have generally been disappointing. The recent researches of Felix and Pitt[1] on the antigenic constitution of *B. typhosus* have thrown fresh light on the significance of these failures. They have been able to identify a third antigen, distinct from O and H antigens, to which they applied the symbol Vi, to denote that it is mainly responsible for the invasive action of the organism, in other words, for its virulence. Experiments on mice have shown that Vi antibody possesses a high protective value by inhibiting the multiplication of organisms but has little anti-endotoxic action, thus differing markedly from O antibody which neutralizes endotoxin. These experiments paved the way for the preparation of a specific antiserum containing both O and Vi antibodies and its application in the treatment of typhoid fever. This serum, which was first used by Felix[2] in Palestine, was not concentrated, as the effect of fractionation on the titre of the different antibodies could not be foreseen. The intramuscular route was employed at first, but later the more serious cases received the serum intravenously with manifestly better effect. The usual dose was 50 c.cm. daily on three consecutive days. Control cases were injected by the same route with similar doses of normal horse-serum in order to discount the possible effect of non-specific protein therapy. Actually a temporary remission of pyrexia was observed not infrequently to follow administration of normal serum but the toxæmia was uninfluenced. Therapeutic benefit was claimed for a majority of the treated cases. Although reduction of toxæmia was observed at all stages of the disease it was found to follow serum administrations most regularly when given in the early stages. By virtue of the Vi antibody it contained, the serum presumably exerted its favourable action in suppressing the usual multiplication and spread of the organisms in the body. McSweeney[3] employed the serum in a smaller series in a Dublin outbreak. His doses were somewhat smaller than those of Felix and the intramuscular route only was used. So convinced was he of the favourable action of the serum in abolishing toxæmia that he soon abandoned his original intention of employing it strictly in alternate cases. It is not possible to arrive at a definite decision on the value of the serum until a more extended trial is made by different workers. Felix intends to prepare a therapeutic serum containing O antibody only to enable him to differentiate with greater certainty the properties and action of Vi and O antigens, respectively. Robertson and Yu[4] have recently criticized the conclusions of Felix and Pitt; they believe that Vi antibody is a protective substance in that it induces passive immunity in mice but that it is not primarily correlated with the virulence of *B. typhosus.* The relationship of this new antigen to the O antigen must remain obscure until it is isolated in a pure state and its characters are more clearly defined.

MEASLES

Diagnosis.—No new diagnostic aid to measles has been discovered in recent years. The phenomenon of Debré and Ravina has been obtained with various samples of placental extract, and has provided an approximate measure of their antibody content, but the practical application of the reaction in diagnosis has not thereby been extended.

Treatment.—It is a matter for doubt whether immune measles serum, convalescent, normal adult, or placental exerts any specific curative action once the disease is established. The therapeutic results of considerable doses, from 20 to 30 c.cm., of convalescent serum given intravenously have failed to convince the impartial observer of its value. It is probable that any benefit that may accrue is attributable to complement and allied bodies, or even to streptococcal antitoxin, in the serum than to a specific anti-measles action. So pronounced are the therapeutic benefits of anti-streptococcal serum in lowering the incidence and severity of complications, the majority of which are due to the streptococcus, that it is administered almost as a routine in fever hospital practice. Doses varying from 10–50 c.cm. by the intramuscular route usually suffice.

Immune measles serum finds its most brilliant application when administered in the incubation period. Doses of pooled convalescent serum, varying in amount from 5–20 c.cm. according to age, given before the fifth or sixth day after earliest ascertained exposure, almost invariably afford complete though temporary (two to three weeks) protection. If given later in the incubation period, but before the onset of symptoms, attenuation of attack is more likely to follow and should be aimed at in every instance when circumstances permit. Normal adult serum in doses exactly double those for convalescent serum gives results which are comparable but tend to be inferior, except where attenuation is sought when there is little to choose between the two sera. A careful statistical analysis of the results of convalescent and adult serum among a large series of cases appeared in the last measles report recently issued by the London County Council, confirming in the main the findings in previous investigations. The difficulty of securing supplies of convalescent serum and of maintaining adequate stocks of fresh adult serum has directed the attention of immunologists to a novel source. From 1933 onwards McKhann[5] and his associates have sought to prepare immune measles serum from placentas. By extracting different protein fractions and determining their antibody content they concluded that most of the measles immune substance was contained in the globulin fraction of human serum. Several workers have reported on the efficacy of this method of prophylaxis, some even claiming that it is equal, or even superior, to convalescent serum. In addition, in two recent publications[6,7] evidence is brought forward to show that oral administration of immune globulin in somewhat larger doses is but slightly inferior to the more usual intramuscular route. Investigations on the preparation and standardization of placental extracts have been carried out in this country for upwards of two years, but caution in assessing the value of the method has delayed publication. Generally speaking, it has been found impossible to corroborate the claim that the substance is equal in potency to convalescent serum. Many samples give no better results than adult serum and the reactions which sometimes follow administration, although not alarming, are a disadvantage, but with improved methods of preparation severe reactions have been almost eliminated. The most recent report of the use of placental extract comes from Germany; Paschlau's[8] findings indicate that the substance is not much superior to adult serum. He offers the explanation that the poor results may be due to the debilitated state of the children inoculated which might possibly render them more susceptible to infection.

The bearing of vitamin defect on measles prognosis was first investigated by Ellison[9] who obtained encouraging results from administration of adequate doses of vitamins A and D. His investigations have recently been repeated on a more extensive scale by Mackay[10] and her co-workers. From a statistical analysis of their results they were able to conclude that administration of vitamins to measles cases is without demonstrable therapeutic effect. Comparison of the controls with the treated cases, which received either vitamin D alone or vitamins D and A combined, showed no differences of statistical significance in respect of fatality rates, incidence of complications or duration of stay in hospital. They made the comment that the short time of observation (average under twenty days) and the late stage of the disease at which treatment was commenced (the majority on the fourth day) may have been factors determining the results.

In recent years a new disease, or, at any rate, an increased prevalence of a disease which formerly was so rare as almost to pass unnoticed, has appeared in association with, or as a complication of, measles, and certain other infectious diseases which are presumed to be due to filterable viruses. Measles encephalomyelitis cases come in crops, just as did post-vaccinal and variolar encephalitis. A recent account from New Zealand[11] describes five cases of measles encephalitis occurring in a limited area where no other cases of this nature have been reported in the last ten years. The measles epidemic in London which has just terminated produced at least nine examples and probably a few mild attacks were missed. Of the nine cases which came under observation, three were mild but the remaining six were severe, three proving fatal at intervals of one to three days from the onset of nervous symptoms. One of the patients who recovered was treated with the serum of a recently-recovered case of measles encephalomyelitis. The attack began in a relatively mild manner, but the symptoms rapidly becoming worse, 25 c.cm. serum was administered intravenously. Within twelve hours striking improvement was observed, due, apparently, to the action of the serum, and the patient subsequently made a satisfactory recovery.

WHOOPING COUGH

For years British pædiatricians seem to have shut their eyes to the dangers of whooping cough, and not until recently has any work of importance been done in this country. Now all are agreed that it rivals measles in its menace to the life and health of the young, and efforts are on foot to apply measures to control the disease.

Diagnosis.—Early diagnosis is essential to limit the spread of whooping cough in a susceptible community. To wait for the characteristic whoop in order to establish the diagnosis spells unjustifiable delay in adopting isolation measures. Examination of the blood for lymphocytosis[12] or the presence of specific complement-fixing substances can have no place in early diagnosis as these appear relatively late in the course of the disease and persist during convalescence. Their chief value is in providing a retrospective diagnosis in missed cases. The recent work of Gardner[13] has abundantly shown that isolation of the Bordet-Gengou bacillus by the cough plate is the only reliable method of securing a prompt and accurate diagnosis. The specific etiological relationship of the bacillus to whooping cough is now generally admitted, even although the coexistence of a virus acting as an excitant of *H. pertussis* or lowering host resistance has been postulated by some workers. The latest contribution to the subject has failed to shed any clear light on the problem. Such evidence as recent animal experimentation[14] has afforded, although indirect, might indeed be held to support the view that a virus-bacterial combination is present in whooping cough similar to that of a specific filterable virus and *B. bronchisepticus* in canine distemper and *B. suipestifer* in hog cholera. Acceptance of this hypothesis does not weaken the reliability of the cough-plate method as the organism is constantly found in whooping cough (and in no other disease) in the early stages of the disease, and rapidly disappears during the fourth and fifth week. By the sixth week the great majority are bacilli-free, confirming long-established clinical observation on the duration of infectivity, but, except tionally, organisms may remain until the eleventh or twelfth week. Experience of the method has shown that two negative plates taken on consecutive days provide sufficient warrant to release the patient from isolation, even although he is whooping violently. Perhaps the diagnostic cough-plate finds its highest value in identifying mild or abortive cases of the disease which would otherwise escape detection. It is more than likely that the variable but occasionally high dispersibility of whooping cough is due to such cases as have been missed in the past, rather than to any intrinsic changes in the infectivity or virulence of the organism itself.

Until the last two or three years vaccines proved inconstant in action or totally worthless. The work of Leslie and Gardner[15] showed that the varying results were due to the use of old, rough, relatively inactive strains as antigens. The substitution of freshly isolated smooth strains (preferably phase I organisms) led to immediate improvement in the results. Large doses and the use of fresh blood (Sauer[16] recommends human blood) have further improved the results. Different workers inject a total of between 20 and 80,000 million bacilli in five to eight doses of increasing magnitude at weekly intervals. Reactions are no more frequent or alarming than after other forms of vaccine prophylaxis. The ideal age to commence vaccination is between six and twelve months; about three months is required to effect immunization. Therapeutic vaccines are best avoided except early in the catarrhal stage. The latest work by Begg and Coveney[17] shows that vaccines are valueless in well-established cases of the disease and not without risk in the presence of serious complications such as bronchopneumonia.

Immune serum or whole blood from convalescents has been employed on isolated cases for many years past. Paterson and his co-workers[18] thought it valueless. More recently Smith[19] was convinced that convalescent serum in doses of 20–40 c.cm. is beneficial in the catarrhal stage but doubts its value later. Control experiments with normal human serum (if such exists) were carried out at the same time to rule out the possibility of psychological influences.

There remains for discussion the treatment of well-established cases in which increasing severity of paroxysms are threatening life by their mechanical violence or by imminent secondary complications. Numerous remedies have been advocated but most appear doomed to disappoint. In controlling the severity of paroxysms luminal sodium is of proved value. In the presence of vomiting the amount of drug administered by mouth is probably not absorbed, but two or three doses given intramuscularly appear to act as a specific in checking the vomiting—often in twelve to twenty-four hours—when oral administration may be resumed. Careful adjustment of dosage to body-weight and constant observation of its action in controlling the spasms short of producing undue somnolence make it an invaluable therapeutic weapon apparently free from risk even in infants.

SCARLET FEVER

Diagnosis.—No advances of note have recently been made in diagnosis. Routine identification of hæmolytic streptococci is made by the blood plate : to differentiate scarlatinal from non-scarlatinal strains determination of toxin-production and of specific type is carried out. The latter test is not sufficient by itself as some strains belonging to the serological types described by Griffith occasionally lose toxigenicity and therefore their property of causing scarlet fever. Whether this loss is transient and can be regained by repeated passages in the human is not clear. In the detection of suspected carriers, particularly in selected individuals, such as midwives and milkmen, it is merely sufficient to carry out the precipitin test which enables the bacteriologist to distinguish between hæmolytic streptococci of human origin (and therefore potentially dangerous) and those of animal origin which are non-pathogenic to man. There are no ready means of determining pathogenicity or virulence; animal tests, especially on mice and rabbits, provide some information but they are far from infallible.

Treatment.—Scarlet fever antitoxin continues to be widely used in the treatment of scarlet fever except in the mildest cases. The intramuscular route is commonly employed, but the intravenous and intraperitoneal routes have their advocates even for cases of moderate severity. Attempts are being made to enhance the therapeutic efficiency of serum by adding to the antigen used for immunization components of the organism other than exotoxin. There is general belief that serum so prepared gives better results than purely antitoxic sera. Nevertheless the therapeutic action of all sera remains mainly antitoxic, rapidly abolishing toxæmia but exerting less evident effect on the invasive properties of the organism.

Local application of germicides with a view to destroying the streptococcus at the site of invasion have proved of little value and may be injurious. Nor have drugs with a general action been more successful, whether given enterally or parenterally. During the last year, however, a new drug has been prepared by Domagk[20] in Germany which appears to have a selective inhibitory action on hæmolytic streptococci. The exact mode of action of the substance, which has been named 'prontosil,' is uncertain; it is not bactericidal in the patients' serum and is only to a limited degree bacteriostatic as growth of the organism in the serum of treated animals and patients is not suppressed although retarded. Colebrook and Kenny[21] have recently reported animal experiments with the preparation and the results of therapeutic trial in a small series of cases of streptococcal puerperal sepsis. The results although not dramatic are encouraging and plead for a more extended trial. The drug has also been used recently on a considerable scale in the treatment of scarlet fever patients in London. Reports suggesting that it exerts a definite inhibitory action on the invasive properties of the organism and reduces complications encourage the hope that it will prove a valuable adjuvant to anti-streptococcal serum. By the oral and intramuscular routes toxic effects are rare and mild, but the makers issue a warning against administering it intravenously.

DIPHTHERIA

Diagnosis.—The researches of Anderson and Macleod[22] and their co-workers have demonstrated that a starch-fermenting strain of *B. diphtheriæ* which they designated " gravis " is responsible for the majority of deaths in diphtheria while " mitis " strains, although perhaps equally infectious, cause relatively benign attacks. Mair[23] more recently proved the existence of " barred " and intermediate strains, and was able to demonstrate change from one form to another in artificial culture. The lack of therapeutic response of " gravis " infections to enormous doses of standard antitoxin suggested that " gravis " toxin differs qualitatively from the ordinary toxin elaborated by the classical Park-Williams strain. As " gravis " antitoxin has proved no more satisfactory in clinical trial than standard antitoxin, it must be assumed that " gravis " strains differ from other strains in invasive rather than in toxigenic properties. The occasional occurrence of clinical diphtheria, sometimes of appreciable gravity, in Schick-negative reactors has suggested that the standard Schick level may need revision in the light of recent events.

Glucose continues to be the chief auxiliary measure in combating the toxæmia of diphtheria. The hopes raised by Benn[24] and his colleagues, that the administration of insulin and glucose together would correct and stabilize the deranged carbohydrate metabolism constantly found in toxic diphtheria, have not been fulfilled. Begg[25], in a carefully controlled series of experiments, confirmed the constant occurrence of abnormal blood-sugar curves and the close correlation between the degree of abnormality and severity of attack but disproved the suggestion that insulin had any influence on the fatality or complication rates.

The value of the Drinker respirator in saving life in cases of post-diphtheritic diaphragmatic paralysis has been confirmed conclusively by the observations of Mitman and Begg.[26] Of the five cases which recovered in this series, four would certainly have succumbed without the assistance of the apparatus. Three died, two from broncho-pneumonia and one from circulatory failure of bulbar origin. They stressed the importance of placing the patient in the respirator as early as possible in order to conserve strength and avert the occurrence of broncho-pneumonia. Since their paper appeared an improved respirator[27] has been designed; the essential features of previous models are retained, but in the new model the chamber is mounted on a rigid chassis whereby the patient can be tilted at will without discomfort, permitting the appropriate posture for broncho-pneumonia or for drainage of secretions in pharyngeal paralysis. The provision of conveniently placed ports permits all essential nursing procedures to be carried out without moving the patient or upsetting the requisite negative pressure.

ACUTE POLIOMYELITIS

Diagnosis.—During periods of epidemic prevalence poliomyelitis may be diagnosed in the pre-paralytic stage of the disease in nearly half the cases. The presence of an acute febrile disturbance at a season when other acute infections such as influenza are rare, especially if accompanied by irritability and general pains, resistance to spinal flexion, and possibly the " tripod " sign are indications for immediate lumbar puncture. The c.–s. fluid changes vary according to the stage of the disease; early in the pre-paralytic stage the polymorphonuclear cells are chiefly increased but as the onset of paralysis approaches the lymphocytes tend to predominate. Globulin appears late in the pre-paralytic stage and actually reaches its highest concentration after paralysis has appeared. The chloride and sugar content is unaltered and the fluid is sterile. When a diagnosis has been made in the pre-paralytic stage, should immune poliomyelitis serum be administered, and by which route? Despite the accumulation of considerable clinical data in recent years in America, Australia and Denmark, mostly favourable, a critical attitude to serum therapy is still justifiable. It must be realized that as an increasing number of cases are being diagnosed in the pre-paralytic stage, an appreciable and increasing proportion, varying considerably according to locality and the character of the prevailing epidemic, will not develop paralysis, whether serum is administered or withheld. In the light of this knowledge it has been found difficult to produce satisfactory statistical proof of the therapeutic efficiency of serum. Moreover it is known that nearly one half of the patients convalescent from acute poliomyelitis show little or no antiviral substances in their serum. Frequently the serum of " normal " individuals who have passed through an epidemic unscathed contains antibody in higher titre than that of the majority of convalescents.

In a recent review of the chief neurotropic virus diseases E. W. Hurst[28] affirms that such experimental evidence as is available supports the view that antibody cannot reach the virus once it has lodged in the cell although it may be conceded that it may possibly neutralize virus passing from cell to cell if such ever occurs. The two latest reports[29, 30] on the employment of immune serum are encouraging but far from convincing. The present position appears to be that serum should be given if it is available as it is unlikely to do positive harm. Recent practice favours a large single dose, 100 c.cm. or more. intravenously, and 10–15 c.cm. intraspinally. If the symptoms remain unabated and the temperature elevated the intravenous dose should be repeated in twelve to twenty-four hours. A third dose is rarely found necessary. Sera with higher antiviral titres than are generally found in convalescents have been prepared from the horse at the Lister Institute. While there are objections to intraspinal administration of horse serum on the grounds that it is liable to provoke a meningeal reaction and possibly favour localization of virus in the central nervous system, these objections do not apply to its use by intramuscular or intravenous routes.

In America considerable attention has recently been paid to the subject of active immunization to poliomyelitis. Various procedures designed to render the virus innocuous without reducing its immunizing properties have been tried. Three methods have met with some measure of success, viz., Brodie's[31] formolized virus, Kolmer's[32] sodium ricinoleate-inactivated virus, and Kramer's[33] immune serum-virus mixture. All are proved potent immunizing antigens but their employment is attended by considerable risks,[34] paralysis and even a fatal issue occurring in some instances. Brodie claims that his preparation has successfully immunized a large series of children in New York City without ill-effects; but only time can show whether the immunity is sufficient in amount and duration to withstand the onslaught of the virus during periods of epidemic prevalence.

CEREBROSPINAL FEVER

Diagnosis.—Recently blood culture rather than lumbar puncture has been employed most frequently to establish early diagnosis. At either end of the scale of severity, the rapidly fatal fulminating attack and the mild or abortive form, the meningococcus may not be found in the central nervous system at any stage of the disease.

The researches of several workers in the last few years on the serological relationships of Gordon's classical four types has shown that types I and III contain two distinct antigens which may be found together in any proportion or separately. These two types therefore now constitute group I which is identified by agglutination with group I serum containing both antigens. Similarly, Gordon's types II and IV consisting of heterogeneous collection of strains with individual antigenic characteristics form group II; for its identification a multivalent serum has been prepared from representative strains.

Maegraith[37] has recently described a precipitin reaction whereby he claims that a diagnosis of meningococcal meningitis may be made in a few minutes at the bedside. A positive reaction may be obtained within twenty-four hours of the onset of meningeal invasion. The test is frequently negative or doubtful in septicæmic or fulminating cases and is presumably always negative in the bacteriæmic stage before localization in the meninges has occurred. The reaction consists of a ring formation from the interaction of multivalent anti-meningococcal serum and centrifugalized cerebrospinal fluid from cases of group I meningococcal infections. The employment of multivalent precipitin tests is sufficient for diagnosis at the present day as the majority of commercial anti-meningococcal sera are multivalent. The author states that it is probable that group II infections can be similarly detected by group II monovalent sera.

Treatment.—Hoyle,[35] in a recent contribution to the subject, recommends that therapeutic serum should be given by the intravenous route only: he reserves diagnostic lumbar puncture for cases in which the blood is sterile, and therapeutic puncture with fluid withdrawal when the intracranial pressure is greatly raised. He suggests that lumbar puncture and spinal administration of serum may do positive harm by facilitating localization of meningococci and formation of pus by lowering cell resistance. Large single doses of serum are recommended, 150 to 300 c.cm. according to age, repeated in twelve to twenty-four hours if toxæmia is uninfluenced. The serum is diluted by twice its volume of physiological saline with 10 per cent. dextrose; it is administered into the vein at body temperature by the gravity method. Various methods of maintaining the temperature have been described, but perhaps the most serviceable is that recently described by Thompson.[36] Hoyle believes that cases of moderate severity, which do not usually come under observation until the meninges are involved, respond to treatment more rapidly by serum given intravenously than by intraspinal or combined routes. It is difficult to reconcile his observations and findings with the well-known resistance of the choroid plexus to the passage of serum molecules. Moreover, humoral immunity is often already established in such cases as shown by disappearance of meningococci from the blood and the presence therein of specific agglutinins. Perhaps an explanation is to be found in the fact that the blood-brain barrier is partially broken down as a result of inflammatory damage and is also more readily passed by a high concentration of circulating antibody which can only be vouchsafed by massive intravenous doses. The observations of Bower,[38] though the number of his cases is small, have considerable bearing on the question at issue. Four of his cases failed to respond to standard serum when given by the intraspinal route, whereupon he prepared serum from the blood of all four patients and injected them by the spinal route, each with his own serum. Improvement was rapid and decisive; the therapeutic response was presumably due to the fact that the specific antibodies he introduced into the spinal canal were in higher concentration than were able to pass the blood-brain barrier.

The relative merits of standard anti-meningococcal serum and Ferry's meningococcal antitoxin have been assessed both in America and in this country. Hoyle has no doubt that the advantage lies with antitoxin. Although his combined results are exceptionally good—a fatality rate of 15·9 per cent. and the amazingly short average period of rather less than fifteen days in hospital—he found in the antitoxin series a decidedly lower incidence of ocular and aural complications. Little progress has been made in standardizing the potency of anti-meningococcal serum as agglutination titres appear to bear no constant relationship to antibacterial properties. On the other hand, Ferry's antitoxin can be readily standardized; the average dose of 50,000 to 100,000 units, according to age, is contained in 150 to 300 c.cm. of serum, which is approximately the same as those of most commercial anti-meningococcal sera.

Banks compared Ferry's antitoxin and commercial sera in a small series and quotes the experience of other workers in London. He found that the advantage favoured antitoxin, particularly in group I infections. He gave huge doses by both the intravenous and spinal routes, usually only one injection by the former route at the commencement of treatment. In his hands cisternal puncture with serum inoculation gave gratifying results. He recommends serum twice daily, alternately by the lumbar and cisternal routes. A few cases which proved refractory or in which basal blockage supervened were treated by ventricular puncture by means of Purves-Stewart's modification of Goetze's channel borer. The introduction of serum into the lateral ventricles was followed by clinical improvement and recovery in a few cases in which death appeared imminent.

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ALLERGIC DISEASES

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IN the present article, an attempt will be made to indicate the main advances which have taken place both in diagnosis and therapy of asthma and allergic diseases since my previous contributions on this subject in *The Practitioner* of October, 1934, and May, 1935. The field will include all the common allergic manifestations.

DIAGNOSIS

In diagnosis the most important points are a careful history, and the use of protein skin reactions and elimination diets. Too much stress cannot be laid on the value of a careful history, for patients often become able to associate symptoms with certain foods or environmental factors and the more fortunate consequently have learnt what to avoid. For the unfortunates, and as confirmatory evidence for the fortunates, specific tests for hypersensitiveness or the use of special dietaries have to be used. In the past the protein skin reactions have fallen into disrepute due largely to the fact that, after manufacture, the test substances rapidly lost their potency. Again, in order to minimize the number of tests necessary, the foods were grouped in a very arbitrary manner, for example, milk and eggs together, and potato and tomato, beetroot and spinach, peas and peanuts were in entirely different groups though belonging to the same plant families. This disability has been overcome to a great extent by the use of glycerinated saline extracting fluids which maintain their potency for many years, and the grouping of the various foods according to their botanical or genetic relationships rather than leaving it to a haphazard choice as in the past. Those supplied by Messrs. C. L. Bencard (1934) Ltd., are recommended, while good extracts of the individual English pollens may be obtained from Messrs. Duncan, Flockhart & Co. Unfortunately, in the various food allergies, there is a tendency for negative or false positive skin reactions to occur. To correct these fallacies, three courses are open—the keeping of a food diary, the use of elimination diets, or the estimation of the leucopenic index. With the *food diary,* the patient is instructed to make a record of all foods eaten in a twenty-four hour period and of any symptoms experienced. Sometimes two foods taken together produce symptoms, when either alone does not. The *elimination diets* first suggested by Rowe may be preferred. These have been revised by him in a recent article.[25] Symptoms should be relieved by the correct diet in from five to fourteen days; should relief not occur by this time, one of the other diets should be tried and some article of the previous diet suspected. With relief, an article from the other diets should be added every four to five days. Many other methods of dealing with the various foods have been suggested. I have prepared[6] a diet for an allergic child which avoids all the common causes of reactions. Urbach[28] gives pure sugar, 300 gm. a day, in weak tea for a two-day period with the patient in bed. The usual successive single or simple food additions are made at twenty-four hour intervals, proteins being first employed, followed by carbohydrates and fats in successive groups.

Since some of the major and many of the minor offenders are of the cumulative type, food diaries or elimination diets may fail to give reliable information as a food may be included in the diet for seven to ten days before symptoms occur, and not infrequently several days must elapse before relief is obtained after avoidance. These shortcomings may be overcome by leucopenic studies. In 1935, Vaughan[29] introduced the *leucopenic index* in the study of food allergy. Two fasting blood-counts are taken at ten-minute intervals, and the patient then eats the food to be tested. Further counts are made at fifteen-minute intervals for an hour, and a final count at the end of an hour and a half. A normal range of fluctuation of 1,000 per c.mm. up or down from the average of the fasting counts is allowed as normal. A drop of more than 1,000 is considered positive. A drop of less than 1,000, if it occurs in all or nearly all the counts, is also considered positive. In two-thirds of the cases these leucocytic responses correspond with the skin reactions. In a small series it was found that if the index was negative, the patient could eat the food even though the skin test was positive. Rinkel[24] has confirmed the suggestion that a post-prandial leucocytosis is usually associated with foods not producing allergy, whereas leucopenia or an indeterminate count was associated with those producing symptoms.

The study of the blood of allergic individuals has brought to light the physiological fact that immediately on ingestion, undigested protein is absorbed into the blood stream even in normal individuals, and Walzer and Walzer[30] have devised a technique for the quantitative estimation of the absorption of undigested protein.

A normal non-allergic adult excludes from his diet for forty-eight hours the foods to be tested. In the morning, on a fasting stomach, a skin test with the human serum containing an extremely high allergin content to the food to be tested is made half an hour before the test meal. From five to thirty minutes after the test meal, a reaction usually appeared at the site of the previous test, and so marks the entrance of undigested protein into the circulation. Measurements of the wheal and erythema are made at ten and twenty minute intervals after the onset of the reaction. Sensitizing injections of the allergin-containing serum are repeated every thirty minutes from the onset of the reaction, and following each in about eight to ten minutes, pruritus, a wheal and erythema developed, the reaction being complete within twenty minutes. The largest reaction usually occurred during the first two hours of absorption of the offending food, subsequent reactions decreasing progressively in size and intensity. By charting the degree of successive reactions as measured by the size of the wheal at twenty minutes a curve can be drawn which graphically represents the tide of antigen in the circulation.

Although much new work has been carried out upon cases of food allergy as these investigations show, *inhalant allergy* has been somewhat neglected. But if the results of skin reactions in a large series of cases of allergy are analysed, the reactions to feathers, animal hairs, dust and orris root largely outnumber all others. Besides the nasal and respiratory manifestations in which inhalant factors must play the most important part, recent work stresses the prominent part played by animal products and silk in the etiology of infantile eczema and neurodermatitis, and of feathers and dust in the etiology of migraine.

In cases of *nasal allergy* with negative skin-tests, Rudolph and Cohen[26] have obtained positive clinical symptoms after applying dry inhalant extracts directly to the nasal mucous membrane. Hence many cases with negative skin tests and absence of circulating antibodies are still probably allergic, resembling in this respect contact dermatitis according to Forman.[13] Such a reaction is comparable to the patch test commonly employed in contact and occupational cases. Dean, Linton and Linton[11] have gone a step further and have devised an intramucosal test in which extracts are injected or rubbed into superficial scratches made into the anterior end of the inferior turbinal. A positive test shows local œdema and swelling of the turbinal within fifteen to thirty minutes, and sometimes followed by typical allergic symptoms. Sometimes positive reactions are obtained with substances which fail to react when injected into the skin.

In the diagnosis of *pollen allergy*, the atmospheric pollen plate is of the greatest service to determine the botanical flora of the district that play an important part in causing symptoms. These botanical studies have progressed in most countries within recent years, but no such additions have occurred in the British Isles since I[3] published a list of British hay-fever producing plants in 1933. To study the various pollen grains that lodge on the plate, Wodehouse[32] has produced a book which tabulates and illustrates these grains, and he has drawn up a master key for their rapid identification. It is still not understood how or why a hay-fever sufferer exhibits symptoms from the inhalation of these minute grains. Harley,[17] in an endeavour to solve this problem, has shown that the blood of normal persons dissolves or phagocytoses pollen granules, whereas with the blood of hay-fever sufferers large numbers of granules are unphagocytosed.

The recent work on *nasal allergy* has been collected in a large monograph by Hansel.[16a] He has shown that the normal physiological responses of the nose, besides warming, moistening and filtering the inspired air, include :—

(*a*) A definite cycle of reaction, the average time for which under all atmospheric conditions, is about two and a half hours. The turbinals on one side fill whilst the other side throws off the secretion. (*b*) This disturbance is largely controlled by gravitation. (*c*) The type of secretion varies with the temperature of the inspired air; in cold air secretion is clear and abundant; in warm air it is less copious and in many cases dull and cloudy. (*d*) A thermoregulatory effect is also present; a current of warm air through the nose leads to a cutaneous vasodilatation, a current of cold air producing vasoconstriction.

Hansel[16] has also drawn up a table which sets out the characteristic changes in the nose and paranasal sinuses in the three common types of so-called inflammation met with clinically—(*a*) infectious, (*b*) allergic, and (*c*) allergic with superimposed infection.

In distinguishing these types of reaction the *nasal smear test* is of the utmost value. Kahn and Stout[18] find that a positive eosinophilic smear of from 10 to

90 per cent. is almost invariably diagnostic of an allergic rhinorrhœa, whilst 4 per cent. or over is highly suggestive (parasites excluded). The absence of any eosinophils at a single examination does not bar allergic rhinorrhœa. This may occur in a pure, thin watery discharge, during allergic quiescence or during intercurrent infections. The persistent presence of abundant non-eosinophilic polymorphonuclear leucocytes in the smear is practically diagnostic of infection. In cases of acute inflammation the p^H of the secretion is definitely on the acid side, whereas in catarrhal conditions it is on the alkaline side (normal p^H of nose, 6·8–7·4).

Buhrmester[7] gives the following differences in chemical composition between allergic secretions and sinus exudate.

	Allergic secretions.	Sinus exudate.
Water - - -	96·90 per cent.	90·10 per cent.
Solids - - -	3·10 „ „	9·90 „ „
Protein - - -	1·90 „ „	8·79 „ „
Ash - - -	1·20 „ „	1·12 „ „
Ash in total solids -	47·80 „ „	10·40 „ „
Calcium - - -	11·30 mg. per cent.	8·90 mg. per cent.
Sodium - - -	291·00 „ „	272·00 „ „
Potassium - -	79·00 „ „	94·40 „ „

The limitations of the X-ray as a diagnostic procedure in cases of nasal allergy depend upon the fact that there is a high incidence of positive findings in normal individuals, and also that allergic œdema is of a transitory nature. Hence marked changes noted in the sinuses at one time may be absent at another. Hansel[16a] states that in allergic œdema the sinus mucosa produces a relatively pale shadow of uneven density, the margins of which are convex shadows of multiple globules, not parallel with the bone shadows. The value of two examinations, one plain, the other after lipiodol installation into the sinuses, is stressed.

In the *cutaneous manifestations* of allergy two distinct types of reaction occur and the fundamental distinctions between them as regards diagnosis have been summarized by Caulfeild[8] as follows :—

	Contact dermatitis.	Allergic dermatitis.
Excitant	Ether-soluble fraction (non-antigenic)	Water-soluble fraction (antigenic)
Modus operandi	By contact	By ingestion or inhalation.
Heredity	Unimportant	Important
Differential tests		
(*a*) Patch	Positive	Negative
(*b*) Scratch or intradermal (immediate reaction)	Negative	Positive
(*c*) Prausnitz Küstner reaction	Negative	Positive

Most will agree that many cases of *migraine* have an allergic basis; in order to bring it into line with the other allergic diseases, all of which depend upon either plain muscle spasm, localized œdema or a combination of both, Goltman[14] describes the mechanism of the attack as follows :—(1) Vasomotor spasm leads to temporary ischæmia of parts of the brain causing symptoms (aura). (2) Secondary vascular dilatation, with resulting œdema of the brain, the severity and extent of which depend on the degree and duration of vasomotor stimulation. (3) Temporary hypersecretion of cerebrospinal fluid accompanied or followed by hyperabsorption, tending to equalize the pressure within the subarachnoid space. In the diagnosis of the etiological agents responsible for these reactions, skin tests and elimination diets play a most important part. The cerebrospinal fluid does not show any significant abnormality or constant deviation from the normal pressure during or between the attacks. The total protein content, cytology and serology are normal, and von Storch and Merritt[27] suggest that any significant abnormality in the cerebrospinal fluid renders doubtful a diagnosis of migraine.

The part played by allergy in the etiology of recurrent swellings of the parotid gland has been suggested by Pearson.[23] He describes cases characterized by the absence of infection and the frequent history of allergy, both in the family and in the occurrence of other manifestations coincident with the development of the swellings; and the passage of plugs containing large numbers of eosinophiles from the parotid duct.

TREATMENT

Asthma.—For the treatment of the acute attack of asthma many commercial firms have produced tablets, the main constituents of which are ephedrine, caffeine derivatives, and drugs with an atropine-like action on the lungs and secretions but without affecting the heart. Though the majority will help to abort a slight attack they have but very little influence on the fully developed state. In the latter case adrenaline remains the chief therapeutic agent. In cases of status asthmaticus, the adrenaline should be repeated each minute if necessary, but in severer cases relief from the drug appears slower and less adequate. For these cases I have recommended the following solution :—

℞	Morphine sulphate - - -	¼ grain
	Atropine sulphate - - -	1/150 grain
	Adrenaline chloride - - -	(1/1,000 solution) to 10 minims

Three minims of this solution are injected hypodermically with the needle left in place in the thigh, and injections of plain adrenaline solution (1/1,000) are continued, one minim each minute. Each fifth minute, in place of the plain adrenaline, one minim of the morphine, atropine, adrenaline solution is given until the whole ten minims have been administered, or relief has occurred. Davidson[10] has suggested the following solution in similar cases :—

℞	Apomorphine	1/100 grain
	Codeine	1—2 grains
	Adrenaline	(1/1,000 solution) 9 minims.

Three minims are administered every five to ten minutes until the whole has been given.

In order to obviate the necessary discomfort and inconvenience of the hypodermic injection Graeser and Rowe[15] have suggested the oral inhalation of a 1 per cent. adrenaline solution from an atomizer. They find it gives satisfactory symptomatic relief in mild or moderate paroxysms and is rarely accompanied by any distressing circulatory symptoms.

Skin tests in cases of asthma and vasomotor rhinitis show a great preponderance of positive reactions to feathers, animal hairs, dust and orris root. Consequently I have suggested that the majority of cases should be desensitized with a mixture of these irritants. Such a solution has been marketed by Messrs. C. L. Bencard, Ltd., under the trade name of "mixed inhalants solution." The main point in the treatment is that large doses are combined with a few minims of adrenaline chloride solution in order to slow the rate of absorption and prevent any generalized reaction. In the past, in attempts at desensitization, the solution has been so weak that desensitization never occurred before the patient showed signs of a general reaction. Other methods of dealing with these air-borne substances have been suggested. Many forms of mechanical and electrical apparatus have been devised to rid the rooms of the sufferer of any deleterious particles. Criep and Green[9] have devised an electrostatic cleaner, the efficiency of which is much greater than that of any of the mechanical filters previously invented. Unfortunately, such methods greatly restrict the sufferers' movements and are only of benefit in a small percentage of cases. On the other hand, Grout suggests painting the outside of pillows and mattresses with a liquid rubber or latex (Vultex, Grade F487), which is odourless and leaves a glazed and transparent surface. It is quite simple, inexpensive and apparently efficient.

The place of specific vaccine therapy in asthma is fast losing ground, as indicated in my article in *The Practitioner* (Oct. 1934). Nitti[22] carried out intradermal tests with emulsions of the germs isolated from the sputum in twenty-two asthmatics. Though some positive reactions were obtained, these were non-specific because (*a*) larger positive reactions were usually obtained with bacteria not belonging to the air-passages (gonococcus, TAB vaccine), and (*b*) cases of bronchitis without asthma and many healthy subjects gave reactions analogous to asthmatics. Only one of twenty-two cases treated by autogenous vaccines remained free of attacks for one year. The bacteriology of the sputum did not vary before and after the vaccine treatment.

A great deal of the difficulty of breathing in the asthmatic attack has to do with the voiding of the tough secretions. Surgeons have suggested sucking these away through the bronchoscope, but Balyeat, Seyler and Shoemaker[1] have shown that by instilling iodized oil into the lungs, these secretions can be displaced and made to float upwards, thus aiding their expulsion. Barach[2] found that the inhalation of a helium 80 per cent. and oxygen 20 per cent. gas mixture was of considerable benefit in these severe cases, since this relatively light respirable gas could be breathed with less effort. Livingstone and Gillespie[21] reported that in half the cases of asthma treated with expiratory breathing exercises for one year, good clinical results were obtained. Consequently the

Medical Advisory Committee of the Asthma Research Council has drawn up a booklet illustrating and describing these special expiratory exercises, and copies of these may be obtained from the Secretary, Asthma Research Council (c/o, King's College, The Strand, London, W.C.2, price two shillings).

Hay-fever.—In the treatment of pollen hay-fever in the British Isles, grass plays the most important part, and a mixture of the common grass pollens to which the patient is sensitive, combined with some dust solution if the patient is also sensitive to it, offers the best chance of cure. Endeavours should be made to reach a maximum dose of at least 2 c.cm. of a 5 per cent. solution of pollen, and if this testing and treatment are carried out each year for three successive years, the majority of patients lose all their symptoms and need no further treatment. The individual pollens for testing can be obtained from Messrs. Duncan, Flockhart & Co., while group reagents and treatment sets are sold by Messrs. Bencard, Ltd. The zinc-ionization treatment of hay-fever and vasomotor rhinitis has recently been to the fore, and apparently it acts as a palliative in over half the cases as it coagulates the reacting membranes. It is far too drastic for general adoption. Many patients experience great pain during the treatments and others have developed maxillary sinusitis and asthma.

Food allergy.—In the treatment of food allergy, the use of food diaries and elimination and addition diets has already been mentioned. Keston, Waters and Hopkins[19] have dealt with the best methods of oral desensitization to common foods. With most foods the initial desensitizing dose should contain about a milligram of protein and the amount increased each fourth day. With egg and milk, they commence with 0·08 mg. of protein. In these cases, if the patient is hypochlorhydric I recommend the giving of 20 minims of hydrochloric acid with each dose, either as liquid or in tablet form (Pulvis acidus tablets, Bencard). As a sequel to his propeptan therapy in food allergy, Urbach[28a] now recommends a "polypeptan" treatment which contains a mixture of twelve different specific foodstuffs in amounts of 25 mg. each.

In the treatment of cases of *contact dermatitis*, avoidance is the safest routine, for attempts at desensitization are rarely beneficial except in cases due to plant oils. In these cases, weekly intramuscular injections of 0·5 c.cm. of a 1 per cent. solution of the extracted oily substance dissolved in sterile almond oil brings quick healing and protection on subsequent natural exposure.

Within recent years, a great prominence has been given to *drug allergy*. Cases of insulin sensitiveness, both to the natural product and to the species of animal from which it is derived, continue to be reported. In the former case, the patient can be desensitized by giving repeated small injections, and in the latter case the use of another brand of insulin frequently clears the difficulty. The dangers of giving aspirin to allergic persons, especially those with nasal polypi, has been stressed and numerous deaths have been reported from minute doses. As aspirin is a constituent of many asthma cures, their dangers must be realized. The part played by drug allergy in the etiology of agranulocytic angina has been definitely proved in the last few years, especially from the use of amidopyrine, employed for the relief of pain and contained in a large number of proprietary preparations. The literature on this subject has been dealt with fully by Witts.[31] Other drugs leading to this type of reaction include dinitrophenol used for slimming, phenazone and gold salts.

Migraine still proves a difficult therapeutic problem. Spectacular cures occur in many cases in which specific foods can be incriminated by the use of skin tests, or elimination diets, or in which other inhalant factors can be found. For patients that do not respond so rapidly the diet prescribed by Földes[12] (1935) may prove of benefit. He finds that attacks of migraine develop in the presence of retention of fluid, the brain tissue taking part in this retention. Attacks may also develop if liquid retained throughout the body becomes mobilized, shifted to the brain, and accumulates therein. A diet termed "anti-retentional" has been developed with the idea of eliminating or preventing the retention of fluid. Such a diet allows a liberal protein intake (1·5–1·8 gm. per kilo. body weight), restriction of carbohydrates (2·5 first, then later 3·5 gm. per kilo.) restriction of fats (40–50 gm. a day), restriction of salt, and restriction of liquid intake (1–1½ litres of fluid a day). The calories should also be low (20–28 calories per kilo.). The use of ovarian or placental extracts in the treatment of migraine has also been suggested, and theelin—1 c.cm. (50 rat units) injected on alternate days during the week prior to the onset of menstruation; emmenin complex (Glaxo)—one or two ounces daily except during the menstrual period; and menformon (Organon)—1 c.cm. injected twice weekly, have been prescribed. Of the drugs recommended, luminal still appears to hold its prominence, but ergotamine tartrate (femergen, Sandoz) is said to lead to abrupt and complete relief in the majority of cases. One milligram tablet one, two or three times a day, or ½ c.cm. injected, is the usual dose advised (Lennox and von Storch).[20]

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ENDOCRINE DISORDERS

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THE main subject to be discussed in this article will be the pituitary and sex glands, and especially recent work on the gonadotropic and male hormones. Recent work on the female hormones will be discussed in a separate article. Failure to mention work on the other endocrine glands must not be taken to signify that practical advances have not been made. In the case of the thyroid, for instance, the anterior pituitary control of this gland, through its thyrotropic principle, has been established. The clinical significance of this in thyroid disease has not yet been worked out, but it is possible to visualize the importance of an anterior pituitary factor in the genesis of certain thyroid conditions—those occurring during the active growth period, for instance. Collip, moreover, has brought forward evidence to show that anti-thyrotropic substances occur, though it is not yet generally acknowledged that they are of the nature of hormones. They may ultimately prove valuable in the treatment of hyperthyroid conditions. In fact the amelioration of exophthalmic goitre by anti-thyrotropic substances has already been reported.

The adrenal cortical hormone has been further studied and knowledge obtained of its value and limitations in the treatment of Addison's disease. Additional knowledge of the functions of the adrenal cortex, especially in its relation to sodium metabolism and the water-salt content of the blood-stream and tissues, has provided a biochemical basis for the diagnosis of adrenal cortical lesions.

GROWTH HORMONE AND HYPOPITUITARY GROWTH DEFECTS

The diagnosis of hypopituitarism with its growth and sex defects has been advanced by recent experimental work. As yet, however, the growth hormone cannot be estimated in the blood and urine as in the case of the gonadotropic hormone. An immense step forward in the knowledge of hypopituitary growth-defects was made when it was shown that removal of the pituitary in young animals produces dwarfism and prevents increase in the shaft length of the long bones. Radiological examination showed delayed osseous development and epiphysial discs open far beyond the normal time. It was then shown that the effects of complete hypophysectomy could be counteracted by anterior pituitary implantation or by the administration of growth hormone parenterally. Moreover, gigantism was produced in normal animals. Experimental proof was thus obtained of growth functions in the pituitary which had long been suspected on clinical grounds.

In the growing child the disturbance of growth resulting from anterior pituitary deficiency and the effect on its skeletal proportions depend on the stage of development reached before the pituitary lesion. In the normal child the infantile skeletal characteristics, short limbs in relation to trunk, tend to give place to the adult type at some time between the sixth and eighth years. An anterior pituitary lesion occurring before or during this period will therefore result in skeletal disproportion—short limbs in relation to the trunk. On the other hand, if the pituitary lesion does not occur until normal proportions have been attained the limb measurement may not be characteristic. Fortunately, confirmatory evidence of hypopituitarism in young children can be obtained by radiological examination of bone development, which will show a delay in the appearance or stage of development of the bone centres and, in older children, a failure of the epiphyses to fuse with the diaphyses at the normal time. Apart from cretinism, hypopituitarism is the only condition, so far as is known, in which delay in the appearance of bone centres occurs. Disproportioned dwarfism, with these radiological findings, is typical of hypopituitarism in young children.

The *treatment* of hypopituitary dwarfism with true replacement therapy has not yet become possible, for reliable growth hormone preparations have not been available for general use. They have, however, been tried in a limited field. Serious obstacles still prevail in the preparation of these extracts. The hormone yield from fresh pituitary tissue under the best conditions is low, and there are also the difficulties of concentration of the hormone and the instability of the extracts obtained. Even in the laboratory complete replacement therapy with highly purified growth hormone has not been attained, though extracts contaminated with traces of thyrotropic, adrenotropic and gonadotropic hormones have completely restored the stature of hypophysectomized puppies. It is particularly important that growth hormone preparations should be free from gonadotropic effects, for activation of the reproductive system hastens closure of the epiphyses. A few clinical trials have been carried out with the purified form of growth hormone with which Evans achieved such striking results in animals. In these, Engelbach, Shelton, Cavanaugh and Evans, Lisser, and Shaefer and Brosius reported that dwarfed children can be made to resume a satisfactory rate of growth. In this country a commercial preparation, available for trial, is the " antuitrin G " of Parke, Davis and Co., but it probably contains other active principles of the anterior pituitary in addition to the growth factor. The recommended dosage of antuitrin G is 1–3 c.cm. two or three times a week. There is no evidence, however, yet to show that with any of the commercial growth extracts results comparable to those in animals can be obtained, and the chief hope for the future lies in the availability of more purified preparations.

MALE SEX DEFECTS, TESTICULAR AND GONADOTROPIC HORMONES

Recent work on the sex glands has shown that their functions are activated and regulated from without by the anterior lobe of the pituitary. The testis itself has two functions, spermatogenesis and the production of an internal secretion. On the latter depend the development and maintenance of the secondary sex characters and the conditioning of the accessory sex organs for the storing, maturing and transporting of spermatozoa. Removal of the pituitary is followed by cessation of spermatogenesis and hormone secretion. Introduction of fresh pituitary substance restores testicular function. Two main groups of therapeutic substances are available for clinical use: (1) gonadotrophic hormones from the pituitary or allied substances obtained from pregnancy urine or other sources; (2) testicular hormone from testis or urine or synthetically prepared androsterone. A clear distinction should be drawn between their effects, for, although the former are gonad stimulating, the latter are not, though animal experiments have shown that testicular hormone plays an important role in maintaining secretory activity in the accessory sex organs, epididymis, seminal vesicles and prostate, and in this way exerts an influence on the viability of spermatozoa. These facts must be borne in mind in considering the treatment of male sex gland disturbances with gonadotropic and testicular preparations. If gonad stimulating effects are required in an individual possessing testicular tissue, gonadotropic hormone should be used. Far from acting as a stimulant to the testis, injections of testicular hormone may have the reverse effect through the pituitary by diminishing supplies of the pituitary gonadotropic substances.

Cryptorchidism.—One of the most dramatic results of gonadotropic substance therapy has been in the treatment of cryptorchidism. This condition, unilateral or bilateral, may be found in otherwise normally developed children, but does occur in thyroid deficiency or associated with the growth defects of hypopituitarism or eunuchoidism. Further knowledge of the underlying mechanism is required before any conclusions can be reached as to the suitability of particular cases for gonadotropic treatment. In the meanwhile it may be mentioned that reports of cases successfully treated with gonadotropic substances are numerous and it would appear that a most promising therapeutic field has been opened up. Gonadotropic preparations such as pregnyl (Organon) or antuitrin S (Parke, Davis and Co.) have been used and can bring about descent of the testes with remarkable rapidity. The dosage varies from 100 units three times a week to 500 units twice a week. In view of their gonad stimulating effects, however, these preparations should be used with due caution.

Delayed puberty and infantilism.—Late puberty may be physiological and an inherited characteristic of certain families. On the other hand, delay may result from severe cachectic illnesses of the developmental period, particularly those in which the absorption of foodstuffs from the gastro-intestinal tract has been interfered with, e.g. tuberculous peritonitis and cœliac disease. In such cases in due course changes of puberty occur, though perhaps not until the age of 17 or 18.

True infantilism results from endocrine disease, and the most striking examples will be due to anterior pituitary, thyroid or primary sex gland defects. The diagnosis of the different types is based on clinical history and symptoms, and aided by a study of the skeletal peculiarities. In the endocrine types, anterior-pituitary and thyroid, a disproportioned skeleton with short limbs is found. In the eunuchoid, primary sex gland deficiency type the limbs are long in proportion to the trunk owing to delay in fusion of the epiphyses.

In the physiological and cachetic types normal skeletal proportions are retained, though this does not hold good if the cachectic condition has been accompanied by rickets as in cœliac disease in which short limbs result from rickety changes at the diaphyses.

Has recently acquired knowledge of testicular and gonadotropic hormones influenced the treatment of these conditions? It would seem that no permanent benefit can be expected from testicular therapy alone as the hormone is not a gonad stimulant and its effects could only be lasting as long as substitution therapy was continued. In the physiological hereditary forms, no treatment is necessary as the condition corrects itself in due course. In the cachectic forms, when severe retardation has occurred, treatment with gonadotropic preparations would be justified and could be expected to accelerate development. In partial eunuchoidism and anterior-pituitary deficiency similar treatment could be instituted with reasonable prospects of success, the results depending to a large extent on the potentially active gonad tissue present. In complete eunuchoidism or anterior pituitary infantilism with absence or atrophy of gonad tissue, the outlook is most unpromising with available hormone therapy. Moreover, it is generally agreed that transplantation and grafting operations in human beings, theoretically the best means of correcting such deficiencies, have not as yet become practicable therapeutic measures.

Impotence and sterility.—Of the disorders of the active sex life period in the male, the two which require consideration in the light of recent work are impotence and sterility. Apart from those cases of impotence associated with serious developmental defects in the sex sphere and other instances in which the condition is secondary to acquired lesions of the thyroid and pituitary glands, the majority of examples have probably a psychogenic origin. Psychotherapy therefore is the most important line of treatment. It is doubtful to what extent the psychic sex-attributes are dependent on the gonad hormones, and the problem is obviously extremely complicated, but, judging by the well-known promiscuity of eunuchs, psychological factors would appear to be more important than endocrine. This is certainly borne out by clinical experience of the treatment of impotence, though in cases resistant to psychological treatment, either gonadotropic or testicular hormones might well be given a trial as an adjunct to psychotherapy. Impotence secondary to thyroid or pituitary disease should be treated by appropriate endocrine therapy.

The diagnosis and treatment of male sterility are a difficult problem in the present state of knowledge. Excluding obstructive cases which have resulted from previous infective disease, there are two groups which might be expected to benefit from endocrine therapy—first, that in which a defect in testicular hormone has resulted in a defect in conditioning of the accessory sex organs so that the viability of spermatozoa is interfered with. In these cases treatment with the gonad hormone itself may be beneficial, though it must be remembered again that this substance is not a gonad stimulant, so that its effects will only be observed as long as the treatment is continued. In the second group sterility is due to absence or impairment of spermatogenesis with resulting aspermia or oligospermia. In these cases gonadotropic substance may be employed. The first reports that these substances stimulated the seminiferous epithelium in addition to their acknowledged effect on the interstitial tissue have now been confirmed, and clinical cases of aspermia successfully treated have been recorded. In others, treatment with gonadotropic substance has failed to produce spermatogenesis. Further trial and observation of a large series of cases is necessary before any definite conclusions can be reached.

Prostatic hypertrophy.—Recent investigations have suggested that certain types of prostatic hypertrophy may be benefited by treatment with testicular hormone. This view is based on the observation that in the mouse prostatic changes occur as a result of treatment with œstrogenic substances. It has been postulated that in man in later life, when the secretion of male hormone is diminished, the unopposed action of œstrogenic substances (found in male urine) may be an important factor in the production of prostatic hypertrophy. As a result, treatment of this condition with testicular hormone has been undertaken. It is too early yet to come to any conclusions as to the value of such treatment, but clinical reports of a beneficial effect on prostatic symptoms have already begun to appear.

DIABETES INSIPIDUS

In the past few years the diagnosis of diabetes insipidus from other conditions in which polyuria is a prominent symptom has received considerable attention and biochemical investigations have proved valuable in differentiating genuine diabetes insipidus from the "symptomatic" or so-called "spurious" form. In true diabetes insipidus there is a loss or deficiency of the anti-diuretic principle from the pituitary intermedia-posterior lobe and with it an inability on the part of the kidneys to concentrate chloride. Thus an increase in sodium chloride intake will be dealt with by a corresponding increase in water output. On the other hand, after the administration of the pituitary anti-diuretic principle in the form of pituitrin or pitressin, a rise in urinary chloride concentration with diminished urinary volume can be obtained. Investigations based on these data have proved most useful in the diagnosis of diabetes insipidus and a routine examination, first a short period on a salt-free diet, followed by a high-salt diet, and subsequently a period under pituitrin, with careful observation throughout of the daily water and chloride output provides valuable information as to the nature of the underlying defect. In true diabetes insipidus, on addition of excess of sodium chloride to the diet, the urinary volume will increase, but the chloride concentration will not. On the other hand, on the administration of pituitrin, the urinary volume will fall, with a rise in the concentration of chloride.

Apart from chronic interstitial nephritis which should cause no serious difficulty in diagnosis with its characteristic urinary and vascular changes, the most likely condition to require differentiation from diabetes insipidus is primary psychopathic polydipsia with its resultant polyuria. Here the habit of excessive drinking is usually an hysterical manifestation, but may be a symptom of frank malingering as was evidenced by certain " epidemics " during the Great War. If the nature of the condition is obscure the tests described above should prove most useful. In psychopathic polydipsia an increase in sodium chloride intake will be accompanied by an increase in urinary chloride concentration.

The treatment of genuine diabetes insipidus depends to some extent on the cause. The condition can be a symptom either of pituitary disease or an hypothalamic lesion. Some general principles may be stated. The most valuable therapeutic measure is severe restriction of the salt intake. Usually a definite reduction in polyuria follows this regime. On the other hand, restriction of fluid cannot be tolerated. The administration of pituitrin in some form plays an important part in treatment and is a valuable measure. It is most successful when given by injection but good results have been obtained recently from its use by the intranasal route. Either a solution of pituitrin can be employed or one of the pituitary snuff preparations lately put on the market. Piton snuff (Organon Laboratories) is well worth a trial.

OBSTETRICS AND GYNÆCOLOGY

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MUCH work has been carried out in the past year in the province of obstetrics and gynæcology, but only that which may prove of practical importance will be discussed here. Researches in relation to endocrinology have attracted considerable attention and world-wide interest, and a large section of this article will be devoted to this subject.

RADIOLOGY IN RELATION TO OBSTETRICS

At a discussion between leading obstetricians and radiologists at a meeting of the Royal Society of Medicine,[1] the feeling was expressed that the value of X-rays, as a method of diagnosis in obstetrics, was not sufficiently appreciated by those practising midwifery. The most important arguments against their use were first, expense, and secondly, the usual satisfactory termination of the majority of confinements making their routine use unnecessary. It was explained that the expense would be considerably diminished according to the increase in demand. The second argument was considered to be untenable. The advantages to be obtained by radiological examination are many, and it is suggested that X-rays may be used in the following conditions.

(1) *Diagnosis of pregnancy.*—Pregnancy can be diagnosed with certainty by radiographic means by the sixteenth week.

(2) *Diagnosis of abnormal presentations* and in all cases when the presentation is in doubt. X-rays are of value in determining also the position and attitude of the fœtus.

(3) *Diagnosis of fœtal malformations* and in cases of

hydramnios in which palpation may be difficult.

(4) *Diagnosis of multiple pregnancies.*—Stereographic X-ray is invaluable, as difficulty often arises in the diagnosis of this condition by clinical methods alone.

(5) *Diagnosis of recent fœtal death* may be demonstrated by means of X-rays. Overlapping of the cranial bones occurs usually about seven days after death.

(6) *Diagnosis of ante-partum hæmorrhage.*—Before labour has begun it may be impossible to determine the cause of the bleeding. Attempts have been made to diagnose cases of placenta prævia by (*a*) injecting an opaque substance (e.g. uroselectan) into the amniotic sac, " amniography," or (*b*) into the bladder, " cystography." The former method usually leads to induction of labour, but cystography might prove of some value. An increase in the gap between the shadow of the fœtal skull and that of the fundus of the bladder would indicate the presence of a placenta prævia. This is only applicable to vertex presentations and to the later weeks of pregnancy.

(7) *Pelvimetry and disproportion.*—It is possible by radiological means to determine accurately the measurements of the pelvic brim—a great step forward. Radiographic cephalometry is not quite so reliable as pelvimetry as the head is not a stable factor. It is believed that the size of the pelvis is more important than the size of the fœtal head, as the former is a rigid tube, whereas the relative size of the latter varies according to its attitude, position and plasticity. The diagonal conjugate in a primigravida may be difficult to measure clinically without causing a good deal of pain, and it is suggested that every primigravida should have her pelvic brim measured radiologically to obtain accurate information as to its size and shape without causing her any discomfort.

(8) *Duration of pregnancy.*—The information available from the appearance of epiphysial ossific centres

is unreliable. The centre for the lower epiphysis of the femur appears during the ninth month of pregnancy; that of the upper epiphysis of the tibia just after birth. Yet not unfrequently at term a fœtus is seen in which no ossific centre has yet appeared. The appearance of other ossific centres are equally unreliable.

TRICHOMONAS VAGINITIS

Cases of persistent vaginal discharge in young women, apart from gonorrhœa, are not infrequently met with and prove most resistant to the usual methods of treatment. Recently this subject has received much attention and it has been shown that probably as many as 37 per cent. of cases of persistent vaginal discharge may be due to the presence of a protozoon, the trichomonas.[2] It is a flagellate organism and may be discovered in a drop smear. The origin of the trichomonas is not clear. Some believe it to be a normal habitant of the vagina, becoming pathological under abnormal conditions; others believe it comes from the bowel. It is occasionally carried by intercourse. The symptoms of a vaginitis of this type are said to be characteristic[3]; there is an acute onset, the discharge is greenish-yellow, profuse and frothy, and pruritus and intertrigo are common accompaniments. The clinical picture shows an acute vaginitis, frequency of micturition, and even incontinence of urine in some cases.

Treatment.—These cases respond in a remarkable manner to treatment with arsenical preparations—such as stovarsol vaginal compound or devegan. The vagina should be dry swabbed and one or two pessaries should be inserted into the vaginal fornices daily, followed in twenty-four hours by a sodium bicarbonate douche. When the discharge is well controlled only one tablet is necessary, the treatment being continued for at least six weeks.

PUERPERAL SEPSIS

Puerperal sepsis is still the most important cause of maternal mortality. Startling results, however, have been obtained in the treatment of this condition by the use of a dye, " prontosil," and Leonard Colebrook and Meave Kenny,[4] in collaboration with members of the staff of Queen Charlotte's Hospital, have shown remarkably satisfactory results. Prontosil was first used in Germany by Domagk. Its mode of action is obscure. It appears to have no direct effect on the hæmolytic streptococcus, neither does it cause a leucocytosis. On the other hand it has been shown to inhibit the multiplication of the organisms in the peritoneal cavity and definitely appears to head off the onset of puerperal peritonitis. The drug is given to all cases showing a hæmolytic streptococcal infection. The skin may acquire a red or terra-cotta tint, and the urine is stained deeply by the dye. Soon after its administration by the intravenous route the patient complains occasionally of a burning or tingling sensation at the site of injection—usually in the pelvis—and there is a mild irritable effect on the genito-urinary tract which is of no moment. Colebrook and Kenny have shown that at the Isolation Block of the Queen Charlotte's Hospital the mortality rate was 26·3 per cent. in 38 cases immediately preceding the use of prontosil. In the following 38 cases in which prontosil was used the mortality fell to 8 per cent. Undoubtedly the results are remarkable and, since the appearance of these figures, have been even further improved. The dose recommended is 20 c.cm. twice daily by the intramuscular route of a 2·5 per cent. solution of " prontosil soluble," i.e. 0·5 gm.; and six tablets daily by mouth, each containing 0·3 gm.

OXYTOCICS IN LABOUR

An oxytocic is a drug that accelerates parturition and this it does by virtue of its power to intensify uterine contractions. Ergot is an oxytocic only as far as it increases uterine contractions, and though it should never be used to hasten labour it is invaluable in the post-partum period. The value of ergot in obstetric practice has been recognized for over 300 years, and has been in used in this country for many years in the form of the B.P. preparation Ext. ergotæ liq. When given by the mouth regular strong uterine contractions occur in twenty to thirty minutes. Investigations on the crude substance led to the discovery of an alkaloid ergotoxin in 1907, and later in 1917 to ergotamine. These are probably identical, and are sold under various trade names all over the world. If given intramuscularly a marked effect is produced in twenty minutes, but when given by the the mouth the effect is erratic and, in addition, is often followed by headache, nausea and depression. Recently H. W. Dudley and Chassar Moir[5] have isolated a new alkaloid which has been given the name of ergometrine. This drug is remarkable for its rapidity of action, and in this rivals that of the extract of pituitary. It is undoubtedly to this drug that the liquid extract of ergot owes its effect.[6] When given by the mouth it acts within five to eight minutes, intramuscularly in three to four-and-a-half minutes, and intravenously in one minute. A strong uterine spasm is produced followed by regular strong contractions, and without any of the unpleasant effects produced by ergotamine.

Dosage.—By the mouth 1 mgm.; intramuscular injection 0·5 mgm.; intravenous injection 0·125 mgm.

Ergometrine is without doubt the most valuable derivative of ergot available, also its action is as rapid as pituitary without the added danger of shock, which may follow the administration of the latter drug. Ergometrine may therefore be given with advantage in these conditions in which pituitary is indicated, e.g. post-partum hæmorrhage.[6] In less severe cases and for a slow involuting uterus the old liquid extract of ergot must still be considered one of the most valuable of drugs in the puerperium.

THE EARLY DIAGNOSIS OF CANCER OF THE CERVIX

Schiller,[7] in attempting to improve the statistics of carcinoma of the cervix, considered that both operative and radiotherapeutic techniques had probably reached their zenith. He therefore concentrated his attention on the diagnosis of carcinoma of the cervix in its very early stages. It is only too common to see cases which have passed beyond the scope of treatment. His object is to detect cancer which is too early to be diagnosed by ordinary clinical methods. The normal stratified epithelium of the vagina and cervix always contains glycogen in its superficial layer. In the earliest forms of carcinoma, even though unrecognizable clinically, glycogen disappears in the affected areas. This can be shown by painting the cervix with an aqueous solution of iodine—Gram's solution is convenient. Healthy epithelium is stained brown, but the abnormal area remains quite white and unstained. The effect is produced in thirty to sixty seconds. The test is simple in its application and the whole examination takes only three to four minutes. The fact that there is an unstained area does not necessarily prove that there is a cancer present. Certain other conditions in which glycogen is absent will show the same effect, e.g. keratinization which might occur in cases of prolapse. It is therefore essential, before making a diagnosis of cancer, to scrape off the superficial cells of the suspected patch and subject them to histological examination, when the diagnosis may be confirmed. In America, efforts are being made to examine patients by such means two or three times a year with the hope of detecting cases in the very earliest stages, and thereby improving the chances of cure with treatment.

ENDOCRINE THERAPY IN RELATION TO OBSTETRICS AND GYNÆCOLOGY

Before discussing the value of endocrine therapy it will be well to describe briefly the physiology of the subject.

ENDOCRINE PHYSIOLOGY.—Research workers[8] have shown that the menstrual cycle is dependent on the influence of hormones, and it is known that the ripening ovarian follicle produces a hormone called "œstrin." This hormone is responsible for the development of the secondary sexual organs, such as the uterus, the vagina, the changes which occur at puberty, and the production of the proliferative phase of the endometrium. Ovulation occurs from the twelfth to the sixteenth day, after which the corpus luteum develops and produces a hormone known as "progestin." This hormone is responsible for the production of the secretory phase of the endometrium, and the preparation of a decidua for the implantation of the ovum. It also influences mammary development. If fertilization fails to occur both these hormones, œstrin and progestin, are withdrawn from the blood and menstruation follows.

The anterior pituitary hormone.—It has been shown that the production of œstrin and progestin is dependent on a gonadotropic hormone which is generated by the anterior lobe of the pituitary gland. This substance has not, as yet, been isolated and must not be confused with the "anterior-pituitary-like" substance which occurs in the urine of pregnant women. This substance, which is known as prolan, is closely related in its properties to the gonadotropic hormone of the pituitary, and is capable of producing the phenomena in the ovary already described. It is believed by some to exist in two forms, prolan A and B, which control the growth of the follicle and corpus luteum respectively. The prolan is generated by the placenta (chorionic tissue),[13] and it is on the presence of this substance in the urine that the Aschheim-Zondek and Friedman tests for pregnancy depend.

Oestrin.—The follicular hormone is found in the follicular fluid, the placenta, and in the urine of normal mature women. It is found in large quantities in the urine of mammalian pregnancy and especially in the urine of pregnant mares. Œstrin has been isolated and prepared in a pure crystalline form. It occurs naturally as ketohydroxy-œstrin. Œstrin exists in several isomeric forms which vary greatly in potency. By a partial hydrogenation, di-hydro-folliculin may be prepared, which is four times as potent as the naturally occurring substance and is of immense importance from a therapeutic standpoint. During pregnancy it has been shown that œstrin steadily increases in the blood serum to a peak at full time; on the other hand prolan arises to a peak in the third or fourth month, and then drops and remains constant.[12] It has been observed that in cases of toxæmia there is excess of prolan and subnormal levels of œstrin,[13] and it has been suggested that quantitative analysis of serum prolan may be useful in the differential diagnosis between pregnancy toxæmia and a chronic nephritis.

Progestin.—The corpus luteum hormone is prepared from extracts of corpus luteum. It has recently been isolated but is not obtainable on the market as such.

The Aschheim-Zondek[9] test for pregnancy and also the more recent Friedman test[10] depend on the presence of prolan in the urine. A positive diagnosis of pregnancy can be obtained by either of these methods in fourteen to twenty-one days after conception has taken place. The Friedman test is becoming more popular as a result may be obtained in twenty-four to thirty-six hours, as compared to four to five days in the Aschheim-Zondek test. A fresh morning specimen of urine should be sent to the laboratory, a catheter specimen not being necessary. These tests are of value in the diagnosis of (1) normal pregnancy, (2) ectopic pregnancy in cases of obscure tubo-ovarian swellings, (3) chorion-epithelioma. Cases in which a hydatidiform mole has been passed should be checked by the Friedman test at regular intervals of a month until a negative result is obtained, for it is possible for chorion-epithelioma to develop insidiously in complete absence of any symptoms and clinical signs.[11]

ENDOCRINE THERAPY.[14]—With the advances which have been made in endocrine physiology it is natural that great hopes should have been entertained for endocrine therapy in obstetrics and gynæcology. These hopes have not been realized, and the subject appears to be more complex than was at first supposed. Much confusion appears to exist owing to the numerous proprietary names that are on the market. These can be divided into three groups.

(A) *Œstrin* is the genetic term to include all the follicular hormones. They are here given in the order of their potency.

		PROPRIETARY NAMES
(1) ŒSTRONE.	Keto-hydroxy-œstrin	Menformon (Organon) Œstroform (B.D.H.) Theelin (Parke, Davis & Co.) Progynon (Schering) Unden (Bayer)
(2) ŒSTRADIOL.	Di-hydroxy-œstrin	Dimenformon (Organon) Œstroform B. (B.D.H.) Progynon B. (Schering)
(3) ŒSTRIOL.	Tri-hydroxy-œstrin	Theelol (Parke, Davis & Co.) (Oral administration)

The use of this drug is indicated in cases in which the follicular hormone is considered to be deficient or absent, e.g. amenorrhœas or under-development of the sex organs. Œstrin is given usually by intramuscular injection, or may be administered in the form of a vaginal suppository. The dose is measured in international units.

(B) *The corpus luteum hormone* (*progestin*).

	PROPRIETARY NAMES
PROGESTERONE	Progestin (B.D.H.) Progestin (Organon) Proluton (Schering) Lutren (Bayer)

These preparations are extracts of the corpus luteum.

This drug is indicated in cases in which the corpus luteum is absent or deficient, e.g. functional uterine bleeding and recurrent abortions.

(C) *The " anterior-pituitary-like " substance.*

	PROPRIETARY NAMES
PROLAN ...	Antuitrin-S. (Parke, Davis & Co.) Prolan (Bayer) Pregnyl (Organon) Follutein (Smith) Ambion $\left\{\begin{array}{l}\text{Thyrotropic hormone}\\ \text{Pregnyl}\end{array}\right\}$ (Organon)

These preparations are indicated in cases in which the gonadotropic hormone of the pituitary is considered to be deficient or absent. They may also rationally be used as an alternative treatment to œstrin and progestin or in conjunction with them.

A knowledge of endocrine physiology is obviously required in order to apply endocrine therapy in a rational manner. It may be said at the outset that the oral administration of the old ovarian extracts is not only useless but a waste of money; on the other hand, when the follicular hormone was discovered and isolated, great hopes were entertained of its value in the treatment of gynæcological disorders. Except for a few isolated instances these hopes have not materialized. Before considering the treatment of individual diseases a few points should be made clear.

(1) The follicular hormone is the only one of these hormones which has been isolated and synthesized and is obtained on the market as such.

(2) The gonadotropic hormone of the pituitary gland has not yet been prepared and the " anterior-pituitary-like " substances in the urine are given in cases when the administration of the pituitary hormone is indicated.

(3) Progestin has recently been isolated, but that obtainable on the market to-day is only an extract of the corpus luteum. Its action is uncertain and it is often considered preferable to give the " anterior-pituitary-

like " substance for its luteinizing action rather than progestin itself. It is to be hoped that in the near future more potent preparations of progestin will be obtainable.

(4) All administrations of the following hormones are given by means of intramuscular injection unless otherwise stated.

PRIMARY AMENORRHŒA.—In these cases there is ovarian deficiency, the uterus is usually small and obesity is not uncommon. Theoretically, treatment is to give large doses of œstrin, followed later and in combination with progestin. With very large doses a menstrual period has occurred, but[15] this treatment is purely substitutional and must be continued.

Dose.—Follicular hormone : Five injections of 50,000 to 250,000 units should be given intramuscularly over two weeks, followed by and in conjunction with 1–5 rabbit units of progestin daily for five days, beginning about the nineteenth day of treatment. Withdrawal of both injections should theoretically be followed by a period. Cases with symptoms of thyroid deficiency should be given thyroid extract, and present a more hopeful prognosis.

Results.—These are disappointing, the expense great, and it is doubtful whether or not the treatment has power to initiate the onset of normal periods. It is therefore purely substitutional and must be continued indefinitely.

SECONDARY AMENORRHŒA.—These cases may follow delivery, abortion, or some constitutional upset and may be due to ovarian deficiency. They should be treated similarly to cases of primary amenorrhœa and this is often followed with some measure of success. On the other hand the degree of success is difficult to assess as so many of these cases right themselves.

Dose.—Follicular hormone : 50,000 international units, twice weekly, followed by and in conjunction with injections of progestin 1–5 rabbit units for five days. Cessation of treatment may be followed by menstruation which may continue normally.

Results.—These are occasionally satisfactory and encouraging. In both types of amenorrhœa it is rational to try injections of the " anterior-pituitary-like " substance " (prolan) as an alternative or even supporting measure.

DYSMENORRHŒA.—It is rational to treat cases of primary dysmenorrhœa, especially those in which pain occurs immediately after the flow, with progestin. It is known that œstrin increases uterine contractibility, whereas progestin inhibits contractibility, and it is believed that many cases of primary dysmenorrhœa are due to some endocrine imbalance.[16]

Dose.—Progestin should be given by intramuscular injection of two rabbit units during the ten days before the onset of the period.

Results.—These are disappointing, and such treatment must remain subservient to other measures.

FUNCTIONAL UTERINE BLEEDING.—Cases due to ovarium disturbances and occurring near the beginning and end of reproductive life are grouped under the term " metropathia hæmorrhagica." They are believed to be due to failure of ovulation to take place, and consequently absence of the corpus luteum with its accompanying hormone. The rational treatment of these cases is administration of progestin or, better, the " anterior-pituitary-like substance " (prolan).

Dose.—In some cases with continuous loss, progestin 2–3 rabbit units daily should be given until the bleeding stops. In cases in which there is menorrhagia, three or four injections of progestin should be given during the ten days before the onset of the next period. As an alternative, " anterior-pituitary-like " substance may be given for its luteinizing properties in doses of 100 rat units daily until the hæmorrhage is controlled.

Results.—These are occasionally successful in young women, and definitely worth a trial in severe cases. On the other hand the value of such treatment is difficult to assess accurately, as many of these cases improve spontaneously with rest in bed. The following prescription has proved of immense value in certain cases of menorrhagia without physical signs, and should always be given a trial first.

℞	Potassium bromide - - -	10 grains
	Potassium chlorate - - -	10 grains
	Calcium lactate - - - -	10 grains
	Tincture of hydrastin - - -	30 minims
	Chloroform water - - -	to 1 ounce, t.d.s., p.c.

In women approaching the menopause, it is preferable to give radium to induce an artificial menopause after a diagnostic curettage has been performed to exclude malignant disease.

HABITUAL ABORTION.[17]—This condition, when every possible physical cause has been excluded, may be due to deficiency of the corpus luteum hormone.

Treatment.—(1) Progestin, 2–3 rabbit units, twice weekly up to the seventh to eighth month, or till the danger point has passed. (2) As an alternative "anterior-pituitary-like" substance, 100 rat units, three injections a week.

Results.—These are fair, and the treatment is certainly worth a trial.

MENOPAUSAL VASOMOTOR SYMPTOMS.—It is known that these symptoms are due to the withdrawal from circulation of the follicular hormone.

Dose.—1,000 - 10,000 international units of the follicular hormone daily until the symptoms disappear, or 1,000 units of follicular hormone administered daily by means of a vaginal suppository.

Results.—These are very satisfactory.

KRAUROSIS is a distressing condition occurring after the menopause and causing pain on walking, and intercourse, and also burning micturition. It is often associated with a caruncle or a senile vaginitis.

Treatment.—50,000 units of follicular hormone twice weekly; symptoms usually disappear by the end of the second week. Or 1,000 units of follicular hormone in a vaginal suppository given daily.

Results.—These are excellent.

SENILE VAGINITIS is a post-menopausal condition. The stratified epithelium of the vagina, due to the withdrawal of the follicular hormone, becomes atrophic and no longer can guard against infection. The *treatment* is as in cases of kraurosis.

Results.—These are excellent.

VULVO-VAGINITIS OF CHILDREN.—Infection of the vagina by organisms, including the gonococcus, occurs for reasons stated above, and treatment with follicular hormone is both rational and successful. Nabarro and Signy[18] have obtained excellent results and recommend the following treatment: 1,000–2,000 units daily by injection, or, better, 4,000 units daily by the mouth, accompanied by irrigation with iodine ʒi to the pint. Enlargement of the breasts due to the activity of "œstrin" is a constant feature. The average duration of the treatment to effect a cure varies from 26–148 days.

STERILITY.—Abnormal endocrine factors undoubtedly play a large part in this distressing ailment, but little is known about them. Obviously, all common possible causes of sterility between the partners should be excluded before assigning the cause to endocrine factors. If hypothyroidism is present in either partner, administration of thyroid may be followed by success. Cases associated with amenorrhœa of endocrine origin should be treated as described, but little success can be expected. It must also be realized that menstruation may occur in the absence of ovulation, and this, in itself, is obviously a cause of sterility. Finally, as stated by Novak, " even if the egg is given off there is no certainty that it is fertilizable."

CONCLUSION

In conclusion, it may be fairly stated that endocrine therapy is of little value in cases of amenorrhœa, dysmenorrhœa and sterility. It is of some value in functional uterine bleeding and habitual abortion, and of undoubted value in kraurosis, senile vaginitis, menopausal symptoms and the vulvo-vaginitis of children. Endocrine therapy has not by any means fulfilled the hopes expected of it and should not be ordered indiscriminately. On the other hand, endocrinology presents a field of great promise and, when the complexities of the subject are more fully understood and more potent preparations available, hormone therapy will play no small part in the treatment of the diseases of women.

I am indebted to Mr. J. Sucket for his assistance in compiling the table of endocrine products.

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DIABETES MELLITUS

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ETIOLOGY—One of the strongest pieces of evidence of the hereditary nature of diabetes mellitus has been furnished by the study[1] of its incidence among twins. Each member of similar twins developed diabetes more than four times as frequently as each member of dissimilar twins, namely 70 per cent. of the former and 16 per cent. of the latter. From these and other data the conclusion was drawn that the potentiality for developing diabetes is transmitted as a simple mendelian recessive trait. The incidence of diabetes mellitus amongst different nations[2] appears to have a direct ratio to the proportion of fat in their diet. The higher the standard of living, the higher the ratio of fat to carbohydrate in the national diet, the greater the incidence of diabetes mellitus.

DIAGNOSIS

During the last few years there has been a tendency to take greater care in the collection of evidence before pronouncing a patient to be suffering from diabetes mellitus. Attention has been drawn to the fact that there are a few individuals who have hyperglycæmic glycosuria only so long as they take very little carbohydrate in their food.[3] A case or two of this had been recorded some time ago.[4] Sugar may be discovered in the urine of these individuals and if a restricted diet be prescribed for them they remain labelled as diabetics indefinitely, while if their peculiarity is recognized they may enjoy any food they fancy without any detriment to their health. These cases seem to be exaggerated forms of the normal, for it has long been known that the response of the pancreas to a dose of dextrose depends upon how well that organ has been exercised during the previous few days; that the normal pancreas after prolonged rest reacts like a diabetic pancreas while a diabetic pancreas after rest reacts like a normal pancreas. This fact makes it of supreme importance that the patient shall have had a diet rich in carbohydrate and of high calorie value for several days preceding the sugar tolerance test. Occasionally a patient must be admitted to hospital to ensure the consumption of sufficient food before the test. Even after satisfactory preparation a typical diabetic curve does not necessarily indicate diabetes mellitus[5] because there are individuals who develop hyperglycæmia of some duration after a dose of *glucose* but are able to take 300 gm. of *starch* daily without developing a higher sugar content of their blood than when on a diet in which the carbohydrate is very restricted.

DIABETES MELLITUS A SYNDROME?

Some authorities consider diabetes to be due to one pathological lesion and one only, while others favour the view that it is a syndrome and that it may be produced by several different lesions. Among the morbid conditions capable of causing hyperglycæmic glycosuria are disease of the pancreas resulting in an insufficient supply of insulin, the over-production of substances antagonistic to insulin elaborated by the adrenal glands, the anterior and the posterior lobes of the pituitary gland and perhaps disease of the liver which prevents the storage of glycogen. The administration of insulin followed immediately by glucose by the mouth to diabetic subjects who had fasted for fourteen hours, did not cause the same changes in the sugar[6] content of the blood in all cases. In some the sugar concentration rose but little or not at all, while in others the immediate effect of insulin was almost negligible. The sugar content of the blood taken from a vein was found to be materially lower than that taken from an artery, only in those patients who reacted to insulin. The conclusion was drawn that diabetic subjects might be divided into two classes, " insulin sensitive " and " insulin insensitive," and that diabetes mellitus occurring in an insulin-sensitive individual was due to a deficiency of insulin, while in an insulin-insensitive individual the syndrome was due to the lack of an unknown factor which is required to sensitize the body to insulin.

These observations are, however, capable of another interpretation. The effect of insulin can be accelerated and increased by section of the nerves to the adrenal glands,[7] also the removal of the pituitary gland[8] renders dogs extremely sensitive to insulin and therefore insulin insensitivity may be due to excess of some antagonistic substance. This is supported by the fact that the blood of some diabetics while fasting contains much more glycogenolytic hormone than that of the normal individual.[9] That there are at least two forms of diabetes mellitus seems to follow from the inhibitory effect of the plasma of some elderly, obese, glycosuric patients[10] upon the action of insulin when injected into rabbits. The plasma from normal people or from young diabetic subjects in whom there had been an acute onset of the disease produced entirely negative results. The plasma of a woman who for more than seven years had had a symptomless hyperglycæmia and had enjoyed ordinary food contained much of the antagonistic substance, probably pituitary in origin.

TREATMENT

The beneficial effect of high-carbohydrate—low-fat diets is becoming recognized.[11] Until recently no patient who had had diabetes mellitus for more than five years failed to show evidence of arteriosclerosis even if quite young. This has been attributed to a high-fat diet. The cause of arteriosclerosis is not known, but a contributing factor appears to be hypercholesterolæmia. Shields Warren[12] has written:

> "Lipoids are not the first wave of assault. They are the reinforcements that consolidate the gains made by the attacking force. The normal intima is not disturbed by fat . . . but given an abnormal intima, atheromata will develop in proportion to the amount of fatty substances present."

The degenerative effect of cholesterol in animals can be controlled if not completely neutralized by the administration of iodides.[13]

DELAYED INSULIN

One of the difficulties in making the metabolism of a diabetic approach that of the normal is the evanescent action of insulin hydrochloride in aqueous solution which, as Joslin has put it, seems to belong to a trade union and refuses to work for more than eight hours. Many attempts have been made to delay and prolong the action of insulin by injection with gelatin,[14] with lecithin,[15] and by suspending it in castor oil. Although insulin suspended in castor oil[16] has a prolonged action and can be combined with the immediate action of an aqueous solution, nevertheless the technique of the injection is not simple and therefore it proved of use only to the intelligent and skilled patient. Recently Hagedorn[17] has introduced an insulin which is absorbed slowly and although it does not keep for more than a week or two when mixed, presents little difficulty in its use. The mode of action of protamine insulinate ("Retard" insulin) is easily grasped. Insulin hydrochloride has an iso-electric point at p^H 5·0 while the hydrogen ion concentration of human blood is p^H 7·35, and therefore even if insulin hydrochloride be injected as a precipitate, it is dissolved by the blood and the effect is indistinguishable from that produced by a solution. Hagedorn succeeded in finding a compound of insulin the iso-electric point of which is close to the hydrogen ion concentration of blood (p^H 7·35), and therefore when introduced into the body as a precipitate is only removed slowly and therefore has a prolonged action.

The action of this compound has been studied by many[18, 19, 20] and has proved of great value especially in those cases in which there is great instability of the sugar content of the blood. Since the action is slow, Hagedorn advises retard insulin in the evening, followed by a meal containing not too much carbohydrate, and ordinary insulin before breakfast, a meal at which much carbohydrate is consumed. Every physician with experience has met cases of diabetes in children who have a concentration of sugar in the blood of 0·3 per cent., which falls to 0·03 per cent. four hours after the injection of insulin even if followed by a meal rich in carbohydrate. These have been a source of great anxiety to parents who have spent nightly vigils by the bedside of the patient, prepared to fight an attack of hypoglycæmia which often took the form of coma without any appreciable warning.

An evening dose of protamine insulinate will not only diminish the risk of these attacks but will frequently prevent the morning hyperglycæmia. Morning hyperglycæmia is not peculiar to children; it has been treated by injections of insulin at 2 a.m. or immediately upon awakening; protamine insulinate makes these disagreeable procedures no longer necessary. Single daily doses of protamine insulinate control some cases of diabetes mellitus provided they be supplied with a diet of low calorie value and much carbohydrate carefully distributed. The cholesterol content[21] of the blood while on this treatment is frequently lower than when on two doses of insulin hydrochloride. It must, however, be recognized that at present it is not possible to prophecy how an injection of protamine insulinate will act. It is less likely to produce hypoglycæmia than ordinary insulin, but it can do so in a most alarming manner.

Among those who have been treated with it is a patient who had been receiving 40 units of insulin three times a day, but even then was occasionally hyperglycæmic and occasionally hypoglycæmic.

On a morning dose of 100 units of protamine insulinate for fourteen days he remained well, the sugar concentration of his blood neither rising above 0·18 nor falling below 0·08 per cent. Then without warning one morning the injection failed to act, the patient became extremely thirsty, ketones appeared in the urine and therefore a small dose of ordinary insulin was injected towards midday and followed by a most alarming hypoglycæmic attack at six o'clock.

Among my patients is a young man who for years has needed four injections of insulin during the twenty-four hours and in spite of these has had a variable sugar content of his blood. For many months he has been having only two doses of retard insulin and the sugar content of his blood has consistently been between 0·15 and 0·08 per cent.

The irregularity of the effect of injections of retard insulin may depend upon the site. If protamine insulinate enters a vein, the effect will be almost the same as the injection of insulin hydrochloride, while if it be placed in fat, its absorption may be delayed for many hours and appear to have little effect.

TREATMENT WITHOUT INSULIN

The danger of diets containing little carbohydrate and much fat has been considered, and at the present day a physician with experience can feel justified in ordering a diet of that type only in very exceptional cases. Although patients with mild diabetes mellitus flourish on a diet consisting almost entirely of carbohydrate, provided that the total energy of the diet is low; nevertheless there are many which can utilize only 120 gm. or less of carbohydrate and these need insulin. A high-protein diet proves valueless because 58 per cent. of the protein is converted into carbohydrate and excreted as sugar. If there were a foodstuff which did not lead to hypercholesterolæmia and was not toxic in any other way, which could supply energy and not be converted into a carbohydrate, and in addition to this was palatable, it would allow many more patients with only moderate diabetes to live without injections of insulin. Such a substance, according to E. de Egedy,[22] exists in the seeds of the *Mimosaceæ* and *Cesalpiniaceæ.* This " protein " he added to the diets of many diabetics in quite large quantities and found that it did not cause hyperglycæmia nor glycosuria. Since this claim alters the fundamental conception of the metabolism of nitrogenous foods it can be accepted only after overwhelming evidence has been collected. Critical tests are being carried out in the dietetic ward of the London Hospital, the first of which has confirmed Egedy's observations.

It has been stated that provided the dose be sufficiently small a cytolytic serum[23] for human pancreas will cause regeneration instead of destruction of the pancreas. Permanent improvement has been recorded in some cases, but the treatment is still in the experimental stage.

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RENAL DISEASE

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THE past twelve months have seen the publication of an enormous number of papers dealing with the various aspects of renal disease. Many of these have included valuable data concerning the experimental production of hypertension and the effects of high protein diets on the production of uræmia. But none can be said to have contained information of so novel and important a character as to merit fuller description in the present review. The increase of knowledge is slow and steady and the promise of the future is immense. In view of the article published on this subject last year in *The Practitioner* it would seem superfluous to make any general survey of the present position of knowledge of renal disease, but there is a steady tendency both in Europe and America towards a more exact classification of the varieties of nephritis, and correct diagnosis is of primary assistance in reaching correct prognosis. It therefore seems desirable to review briefly the present ideas concerning diagnosis. On the therapeutic side the claims made for mandelic acid have been so justified that the present method of employing this valuable substance is also given further attention.

DIAGNOSIS

The diagnosis of nephritis usually presents little difficulty. If there is a persistent albuminuria, with or without hæmaturia, accompanied by casts but without evidence of disease of the bladder, urethra or ureters, it is safe to assume that some form of nephritis is present. But the difficulties of diagnosis then begin because it is important to extend the inquiry sufficiently to enable the case to be placed in one of the sub-groups, and it is only when more exact classification has been achieved that an estimate can be given of the prognosis, and it is only then that proper treatment can be instituted.

In a great many cases there is no clue in the history to enable the observer to decide the date of origin of the nephritis with any exactitude, but when the disease occurs in connection with one of the acute infections, or in a person known to have had normal urine a short time previously, or when it occurs accompanied by hæmaturia and epithelial casts, and with pronounced fever, it is justifiable to place the case in the category of acute nephritis.

But in all cases the most important point in deciding exact diagnosis, and the point on which the practitioner eager to arrive at a correct prognostic outlook should concentrate, is the condition of the cardiovascular system. Thousands of cases labelled as chronic interstitial nephritis are cases of essential hypertension in which a generalized sclerosis of the smaller blood-vessels is producing renal effects which are in reality only a minor aspect of the complete picture. In such cases knowledge that the patient has suffered from hypertension for a long time is of great value in that it implies that the risk of a renal death, from uræmia, is remote as compared to the risk of a cerebral disaster or of cardiac failure. It further implies that treatment should be directed to the removal of physical strain and the relief of the arterial hypertension, rather than to control of the blood nitrogen through dietetic limitation of the protein intake. The nomenclature of nephritis is still in the melting pot, but it would seem much better in such cases to employ labels such as "ischæmic nephritis" or "nephrosclerosis" rather than "chronic interstitial nephritis," because the latter term carried the suggestion that there is some parallel between these cases and those in which the origins are in the kidney itself.

The prognosis of acute glomerulo-nephritis is good, the majority of patients making a complete recovery, but there remains a proportion which pass on to a chronic state with recurrent attacks of œdema and other manifestations. In this group also the cardiovascular aspect is most important; a high proportion develop hypertension, cardiac hypertrophy and retinal changes. In such cases the prognosis is invariably bad and it should be recognized far more readily than is the case to-day that subacute or chronic glomerulo-nephritis with hypertension is a condition carrying a most unfavourable prognosis whereas cases of renal œdema with heavy albuminuria but with no elevation of the blood pressure and normal retinæ are a cause of anxiety in that they may be ill for years and may succumb to an infection but carry little risk of uræmia as long as cardiovascular manifestations remain absent.

TREATMENT

The treatment of renal disease was discussed in this Journal last October, when it was pointed out that the most notable recent advance was in the treatment of infections of the urinary tract, including cystitis and pyelitis. It has long been recognized that many cases of *B. coli* infection get well with no treatment more drastic than the administration of large quantities of fluid and that still more get well if the urine is kept alkaline with potassium citrate or sodium bicarbonate. Emphasis was laid on the point that many of the supposed failures of alkalis were due to inefficient dosage, the important principle being that sufficient should be given to make every specimen of urine alkaline throughout the twenty-four hours and that the patient should be taught to test each specimen and adjust the dosage in the requisite manner.

But it has always been acknowledged that even with the greatest care a certain number of cases proved resistant, and, although in these a proportion are found in which some obstruction in the renal pelvis or ureters is the cause of chronicity, there are others in which the infection persists in spite of the greatest care. Ketogenic diets, including high proportions of fat and very little carbohydrate, were found to benefit such patients but were expensive, unpalatable, and often impossible to administer in practice. The administration of mandelic acid as an alternative means of increasing the proportion of keto-acids in the urine was already proving, in 1935, to be a valuable alternative procedure, and the experience of the past twelve months is that this form of therapy has more than fulfilled its promise.

All those interested in renal disease must have had the experience, during the last twenty years, of seeing a new panacea introduced every few months, only to be relegated to the dust-bin after a transitory popularity; it would seem that at last this succession of failures is arrested and that we now possess a really valuable addition to the therapeutic armamentorium. To be effective the salts of mandelic acid should be administered when the urine is acid, and this is effected by giving some thirty grains of ammonium chloride six-hourly until the p^H of the urine is below 5·4. To test the reaction of the urine methyl-red solution is employed, five drops of which, added to 2 c.cm. of urine, will produce a bright pink colour if the reaction is correct. It is well to confine the administration of ammonium chloride to the minimum necessary to secure this reaction because it is nauseating and some patients dislike it intensely. The reaction of the urine being satisfactory about 4 gm. (sixty grains) of sodium mandelate are given every six hours daily, and it is usually found by bacteriological tests that the urine becomes sterile in a week to ten days; occasionally three weeks are necessary to produce this result. The urine must be carefully examined for albumin and casts because these have been found to appear in a small proportion of cases and when a serious degree of disease is present in the kidneys the treatment may be inapplicable. When, however, it is recognized that severe urinary infection is a most dangerous complication in the presence of nephritis of any form it will often be obvious that the slight risk presented by the administration of mandelic acid is one to be faced courageously.

I had recently under my care in the Middlesex Hospital a woman with intense albuminuria and a tendency to œdema who has suffered from nephrosis for more than fifteen years. She was admitted to hospital on account of a recent urinary infection which, in spite of the most careful treatment on orthodox lines, failed to clear up and provoked intense dysuria and frequency. Sodium mandelate was administered and the infection cured within a week to the immense benefit of the patient.

The nauseating character of ammonium chloride has already been referred to and sodium mandelate itself is often found very unpleasant to take. There is promise that this may be overcome by the employment of ammonium mandelate. This preparation must be given in fluid form and is supplied by one of the large firms as an elixir containing 34 grains of the salt in each fluid ounce. It is still on trial but would seem to be a valuable modification of the ordinary type of treatment in such cases.

INOPERABLE CANCER

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BY inoperable cancer is meant a malignant growth which cannot be removed owing to its fixity, its position, or to the poor general condition of the patient. It may be the primary growth or recurrences which are inoperable. In such cases, other than treating the patient with drugs on purely palliative lines, two methods of treatment must be considered. The first is some form of radiotherapy, and the second some procedure for relieving pain. Before discussing these, however, some brief reference must be made to the many " cancer cures " which have from time to time been put forward. These cures are without number, and many of them without any scientific basis. If any drug or method of treatment in medicine or surgery is of real value, it rapidly comes into general use and will stand the test of time. But it is not too much to say that this test has proved too severe in the case of all treatments for cancer other than excision or radiotherapy, when critically and scientifically examined. In recent years, treatment by some of the heavy metals, particularly lead selenium and gold, has been enthusiastically tried. Blair-Bell claimed success with treatment by lead, but similar results were not obtained by other workers using the same technique, and it has fallen into disuse. A. T. Todd of Bristol introduced the lead selenide treatment of cancer, and in 1934 published the results of quite a long series of cases. Of the whole series of 70 cases, he stated that apparent cure had resulted in 20 per cent. The treatment has not gained acceptance, however, as others have not obtained the same results. Pituitrin, adrenaline, phospholipins, extracts of connective tissues derived from an area in a pig or cow corresponding to that of the primary growth in the patient, as well as parathyroid extract and various sera, have all had their advocates in recent years. Some of these treatments may have been successful in the laboratory, but clinically they have not proved themselves.

In a discussion on the palliative treatment of cancer, mention must be made of Coley's fluid. Last year the late W. B. Coley reviewed the results he had obtained from 1893 to 1934 in the treatment of inoperable malignant tumours with the toxins of erysipelas and *Bacillus prodigiosus.* The best results had been obtained with inoperable sarcomas of soft tissues, and, from his sincerity and genuine enthusiasm, it is impossible to believe that he did not obtain the results he claimed. Although the treatment has been tried extensively by others similar results have not been obtained, and with his death the treatment is now likely to be forgotten.

With regard to radiotherapy, the position is entirely different. Radiotherapy, which may be in the form of X-rays or radium, is a well-tried weapon, its technique is continually being improved, and it may not only decrease the size of an inoperable growth, but it may cause its actual disappearance and leave the patient without signs or symptoms of disease for years. Certain growths are more sensitive to radium, others to X-rays. In some situations X-rays have to be used because radium cannot be applied; in other cases they are used because the area involved by the growth is too vast for the application of radium; or again, when open operation would be necessary for the implantation of radium, and is contra-indicated by the patient's poor general condition. The uses of radium and X-rays in inoperable cancer will be described separately, as they have their different advantages and values.

RADIUM

The element radium or its emanation radon, a heavy inert gas, may be used. The latter has the same radio-active and healing properties as radium, but has the disadvantage that it " decays," losing half its strength in 3–8 days, and in nine days has only a fifth of its original power. Radium loses nothing as it gives off radon and thus the latter is cheap, apart from the expense of collecting it. This is its chief advantage over radium and at once makes it more accessible for general use. The decaying of radon is, however, one of its chief advantages; after a month it is practically without any action, so that, with inoperable growths in not easily accessible places, the radon seeds may be left permanently in the tissues, a thing impossible with radium, owing to its continued action and costliness. There are several ways of using radium.

(1) *Surface applications.*—Here the radium in needles or suitable applicators is applied to the surface of the growth. It is a method which is not used much for cancer, but it is sometimes needed for a surface growth which is inoperable and infected.

(2) *Interstitial implantation.*—Radium needles or radon seeds are put into the tissues either deep to the growth or sometimes actually into it. This method of using radium is that which is most commonly employed both with operable as well as with inoperable growths. An inoperable growth is usually of such a size that the radium needles have to be put into it as well as deep to it. Dosage is largely a matter of experience, but a rough rule of help is, that one milligram of radium for five days should be used for each cubic centimetre of tissue.

(3) *Distance therapy.*—During the last few years this method of treatment has been under trial. The

radium, in a container with suitable screenage, is held close to the lesion for a certain number of hours a day. It has brought about a great improvement in some advanced cases, and sometimes otherwise untreatable growths in the mouth and other regions have benefited enormously. It is, however, too early to give a final judgment on the merits of this method of treatment.

The chief situation in the body where radium is of value in the treatment of inoperable cancer is the mouth. Stanford Cade quotes his own figures for inoperable cancer treated with radium as follows: Out of 350 cases 11 per cent. showed a five years' survival and 85 per cent. showed healing of the primary lesion, so that the enormous benefit to be derived from radium for carcinoma of the mouth is obvious. The majority of the patients are freed from the pain and discomfort of a fungating growth in the mouth. When spread of the growth occurs or recurrence takes place, it is usually in the neck, and less distressing to the patient. In the case of inoperable rectal growths also considerable benefit is obtained by the implantation of radium needles or radon seeds, sometimes to the extent of the ulcer healing. The uterus is another place where inoperable carcinoma may be enormously improved by radium; the discharge is diminished, bleeding stops and the ulceration may heal and remain so for months or even years.

X-RAYS

For inoperable cancer X-radiation has two main uses: (1) For inoperable growths, X-radiation is used to improve, if not cure, the condition, and it is often the only method of treatment available. (2) As a preliminary to operation. A growth which, from its extent and fixity, is inoperable, may, after X-ray treatment, become decreased in size, and sufficiently movable to make surgical extirpation possible and desirable.

Before mentioning examples in which X-radiation is of value in inoperable cancer, a warning must be given about giving X-ray treatment to quite hopeless cases. It must be remembered that a course of X-ray treatment often makes a patient tired and exhausted, and it should not be given simply for the sake of "doing something." The patient will often actually be made more uncomfortable, and by making his general condition worse, thus allow the growth to progress more rapidly; his plight will then be worse than before and he and his friends will loose all faith in the treatment. It also cannot be too strongly emphasized that X-ray treatment should only be carried out by those properly trained in the methods, for in the hands of the ignorant great damage can be done to the patient and prolonged suffering caused. In many cases of inoperable and perhaps ulcerated carcinoma of the breast a remarkable improvement follows a course of X-radiation. Sometimes this is all that can be done, but even this, though it may not cure the growth, greatly ameliorates the patient's condition, for she is freed from the distress of extensive superficial ulceration. But in other cases an inoperable breast tumour is so diminished in size and made freer from the surrounding structures by X-ray treatment that it can be removed by radical operation. Carcinoma of the œsophagus is one which, from its position, is inoperable. In the last few years Levitt, by most careful work, has shown that X-rays will heal the ulceration of an œsophageal growth and re-establish the lost power of swallowing. New growths of the testicle are very sensitive to X-rays. After removal of the testicle the inoperable recurrences in the abdominal lymph glands can often be made to melt away with X-rays in a remarkable manner, but a permanent cure is most unlikely as the glands enlarge again. For cancer of the alimentary tract, below the lower end of the œsophagus and above the rectum, little can be done by any form of radiotherapy.

RELIEF OF PAIN

Of drugs, opium and its derivatives are unquestionably the best. It is not proposed to discuss these. Instead, in this article reference will be made to the various operative measures which have been used and are at present in use. The division of sensory nerves supplying the part has often been tried, and, in the case of limbs, may be successful, but when large areas in the head and neck, or chest and abdomen, are involved, it is difficult, or impossible, to divide the necessary nerves and even when it can be done, an extensive operation is necessary. Division of the posterior spinal roots supplying the painful segments was the next procedure to be carried out, but this necessitated a laminectomy, of itself a severe procedure, and it was not always as successful as might have been expected on anatomical grounds. Spiller demonstrated the position of the pain fibres within the antero-lateral column of the spinal cord and division of these (the operation being known as "cordotomy") has been carried out on many occasions, and, if satisfactory, gives complete relief of pain below the area of section of the tracts. The operation of cordotomy is a specialized one, and requires a very exact knowledge of the position of the tracts of the spinal cord. More recently, the operation of division of the pre-sacral sympathetic nerve has been carried out for the pain of inoperable and recurrent cancer in the pelvis—particularly of the bladder and uterus.

In 1930 Dogliotti introduced a method of relieving pain by the injection of alcohol into the spinal canal. From animal experiments he showed that it was possible to damage the posterior sensory nerve roots without paralysing the anterior motor roots. The principle of the injection depends mainly on two physical facts :—

(1) That the specific gravity of alcohol is much lighter than cerebrospinal fluid; and

(2) That by putting the patient in a certain position, any given part of the spinal canal can be placed at a higher level than the rest.

The level and extent of the spinal cord which it is desired to block is carefully determined on anatomical grounds, not forgetting the sympathetic pathways. The patient is then most carefully and exactly placed in the correct position, lying on his side with a sand bag so placed under him that the centre of the part of the cord to be blocked is the highest point. The head must be kept definitely below the level of the site of injection. A fine lumbar puncture needle is then introduced in the mid-line into the subarachnoid space. When it is seen that clear cerebrospinal fluid is obtained, the required quantity of alcohol is injected. The amount has to be judged in each case, but about eight to ten minims is usually correct and sixteen minims may be used safely, but larger doses should be avoided. The injection must be made extremely slowly, so that the alcohol will not disturb the cerebrospinal fluid unduly and will lie on the top of the fluid, bathing only the correct roots of the spinal cord. After the injection the patient must stay in the same position for at least ten minutes, after which he may lie flat in bed, with the foot of the bed raised for two hours. There is sometimes a burning pain in the area of the body corresponding to the part of the cord bathed in alcohol and this is often a favourable sign that there will be a good result as regards relief from pain. This relief does not come on suddenly, and frequently not until the next day. There is sometimes a transitory affection of the sphincters, making it necessary to catheterize the patient for a few days. If the pain is bilateral or central, the injection may be repeated in a few days time with the patient so placed as to affect the other side. By a different technique placing the patient in the prone position with the head lowered and the area of the cord which it is desired to affect raised so that it is uppermost, the dorsal sensory roots of both sides may be blocked at the same time.

If the alcohol injection has been successful, there is a great, if not complete, loss of pain; but the effect goes off after some months. Most patients, however, will have died before this has occurred; if they have not, the injection may be repeated. This subarachnoid alcohol injection is not in the least a severe or exhausting procedure for the patient and has for this reason taken the place of cordotomy, posterior rhizotomy and division of the presacral nerves, and, as Stern has said, " It obviates the necessity for using narcotics in large doses, and diminishes the possibility of making drug fiends of chronic invalids. By relieving pain it allows more intensive X-ray, radium, or other medical treatment to be given, and so tends to prolong life."

There still remains a group of surgical operations which frequently have to be performed in cases of inoperable cancer—*palliative operations* which are done simply to relieve distressing symptoms which have arisen as the result of the anatomical position of the tumour, no attempt being made to remove the growth itself. Examples of this group are: A subtemporal decompression for a cerebral tumour causing loss of vision from severe papillœdema, gastrostomy for carcinoma of the œsophagus, a short-circuiting operation for a carcinoma of the pylorus or the colon, and a colostomy for an irremovable growth in the rectum. Most of these operations are designed to overcome obstruction arising in a hollow viscus. It is not usually advisable to do the operation until symptoms demand it because the patient may die before the necessity for it arises; on the other hand, the operation should not be delayed until the patient is in distress from severe symptoms. An optimum time should be chosen between these two extremes.

OPHTHALMOLOGY

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NO new discovery of outstanding importance in the treatment of eye disease has been published during the past year, but a number of communications from workers in different fields have added to our ability to estimate the value of newer methods of treatment, besides, in some cases, suggesting improvements in the technique of their application.

DETACHED RETINA

As far as ophthalmology is concerned, there can be no doubt that the greatest advance made in recent years is in the operative treatment of detachment of the retina. This treatment is entirely based on Gonin's discovery that retinal detachment is, in the great majority of cases, primarily caused by the presence of a rent in the retina which may result from a blow on the eye or head or from the spontaneous rupture of a degenerate retina, and that if this rent can be successfully repaired, replacement of the retina will in the majority of cases result. It is obvious that reparation of the actual retina is impossible, but fortunately the same result can be obtained by producing artificially an organic adhesion between the retina and the underlying choroid. This adhesion or series of adhesions must completely surround the retinal tear, shutting off the sub-retinal space from the vitreous, and the object of all operations for retinal detachment should be to determine the closure of the retinal rupture by means of such an adhesion. Normally, of course, the retina lies upon the choroid without being in any way attached to it, and in order to produce an artificial adhesion between these two coats of the eye it is necessary to cause coagulation-necrosis of the choroid over the desired area, for the scar tissue resulting from such a procedure binds the retina and choroid firmly together. Chemical cauterization is still used by at least one surgeon (Guist) to effect this coagulation-necrosis, but the great majority employ an electric current in some form or other for the purpose, the current being applied to the surface of the eye over a series of almost contiguous points until the necessary area is covered. The diathermic current is the form most commonly employed, one electrode being strapped to the patient's arm and the other applied to the surface of the eyeball in the desired situation. The electrode applied to the eye may be blunt (Larsson) or take the form of a sharp needle which perforates the sclerotic (Safar). The relative merits of these two methods are probably about equal as far as can be judged from the published results but the technique of the operation naturally varies according to which is used. The most recent development in this field is the use of the electrolytic current instead of the diathermic (Vogt). By this method the blunt positive electrode is placed on the surface of the eyeball, and the negative one, which is sharp, is made to perforate the sclerotic at about three millimetres distance from the former, this manœuvre being repeated over a number of contiguous areas till the whole of the desired area is covered. The chief advantage gained by employing electrolysis is that the apparatus used to generate the current is much simpler than that required for diathermic applications. Its published results up to the present are at least as good as those obtained by diathermy, but a more extended trial is necessary before a final judgment as to its efficacy can be made.

Whatever the method used, the sub-retinal fluid which invariably underlies a detachment must be evacuated, so as to allow the retina to come into contact with the area of choroid which has been electrically treated. Also before beginning the operation, the corresponding position of the retinal rupture must be localized on the outer surface of the eyeball. Various devices have been invented for the latter purpose, among the most recent being an instrument which is founded on the principle of trans-illumination.

An estimate of the results of operation for retinal detachment may be gained from an analysis which I published in July, 1935, of a series of 70 consecutive cases, favourable and unfavourable, which I had operated upon by Larsson's method; in thirty-six of these cases I had obtained a successful result, the percentage figure being just over 50. The prognosis as regards success is a variable one according to the circumstances of the case, and is influenced by a number of recognizable factors.

ETIOLOGY OF CATARACT

It has long been held that the development of senile cataract must be primarily due to an alteration in the nutrition of the lens. Recent experiments on guinea-pigs have been made by two Russian workers (Moninkova and Fradkin) with a view to determining the effect of vitamin C on the lens metabolism. The results of these experiments point to the conclusion that cataract may be caused, at least in these animals, by a disturbance of the permeability of the eye associated with an insufficiency of vitamin C.

EXTRACTION OF CATARACT

The operation for extraction of senile cataract by the ordinary (extracapsular) method consists in the removal of the hard central nucleus, the lens capsule being left behind. In addition to the capsule there is always a variable amount of soft cortical lens matter which eventually undergoes solution by the aqueous humour. In some cases, expecially when a large amount of residual cortical matter is present, an iritis may follow the operation, and this has been attributed to the occurrence of an anaphylactic reaction to the retained lens protein. Goodman has recently carried out tests on 700 patients, which consisted in observing the presence or absence of a cutaneous reaction to the intradermal injection of lens extract. Of these patients 16·9 per cent. showed a positive reaction, and this he interprets as indicating a sensitivity to lens protein. He advises the desensitization of sensitive patients prior to operation by means of graded injections of lens extract, and claims that by this means post-operative inflammation of this type can be prevented. Removal of the entire lens in its capsule (intracapsular extraction), as opposed to the ordinary method of removal of the lens substance only, with retention of the capsule, has certain supporters, especially on the Continent and in India, different operators using different techniques. Intracapsular extraction has not, however, been adopted to any great extent in this country owing to the belief common among English ophthalmic surgeons that, although brilliant results may undoubtedly be obtained in certain cases, the intracapsular method can not be as safe as the extracapsular owing to the accompanying danger of loss of vitreous humour.

CORNEAL OPACITIES

Selinger has reported beneficial results from the treatment of corneal opacities by the introduction of 2 per cent. quinine bisulphate ointment into the conjunctival sac. The variety of opacity which responds most readily is, as would be expected, that consisting of recent cellular infiltrates in the cornea, such as are found in interstitial keratitis. He claims that the photophobia and blepharospasm in patients so treated disappear rapidly, and that the opacities become appreciably less dense. Older corneal opacities, even of as long as two years' duration, are also said to show marked improvement. Selinger attributes these results to the direct effect of quinine on the abnormal cellular elements in the deeper layers of the cornea.

TOBACCO AMBLYOPIA

Blindness from tobacco smoking is a comparatively rare affection. It is met with usually in men over forty, and occurs most commonly as the result of pipe smoking, occasionally from cigar smoking, and rarely from cigarettes; it is not necessarily caused by the consumption of large quantities of tobacco, but seems rather to be due to a failure on the part of the individual concerned to deal with the poisons absorbed from tobacco. The usual treatment of this affection is to insist upon complete abstinence from tobacco, improvement being always slow. Potassium iodide or strychnine is frequently prescribed, but that they have any beneficial effect is problematical. In 1901 Parsons suggested that one of the factors causing blindness might be the vasoconstrictive effect of nicotine, and recently good results have been reported from the use of vasodilating agents. Intravenous injection of sodium nitrite or the oral administration of erythrol tetranitrate are the methods which have been employed. Restoration of vision is said to be rapid and improvement has been reported even in a certain number of patients who continued smoking during the course of treatment.

X-RAY TREATMENT OF CORNEAL LESIONS

The use of X-ray applications direct to the cornea in small doses (about one-third of the erythema dose) has proved to be beneficial, especially in cases of acne rosacea keratitis, and of recurrent erosion of the cornea. Davies has recently reported the cure of a case of bullous keratitis by this means. This form of keratitis has an obscure etiology and is very resistant to ordinary methods of treatment. In the particular case reported both eyes were affected and both responded eventually to repeated applications of the rays.

RADIUM TREATMENT OF INTRA-OCULAR GROWTHS

The tumour commonly known as glioma of the retina (which is not a true glioma but a highly malignant growth of the neural epithelium), although frequently monocular, may occur in both eyes simultaneously. In the latter event radium treatment is a justifiable alternative to excision of the second eye if useful sight is still present, and fortunately the tumour, consisting as it does of embryonic cells, is extremely radiosensitive. The method of suturing radon seeds to the sclerotic over the site of the growth has given some good results (Foster Moore). I have published a case of glioma of the retina treated by radium applied externally. The radium was fixed in position by inserting it in a wax mask moulded to the patient's orbital region; this mask when fixed to that region fitted closely and immovably. Two prolonged applications of radium were given in this way. Six years have now elapsed since the second course of treatment, and the patient is still alive and able to see. No opacification of the lens has as yet occurred as the result of the radium applications.

IRITIS

When the iris becomes inflamed, and more especially when the inflammatory process is acute or subacute in character, a sticky fibrinous material is exuded from the blood vessels with which this structure is richly supplied. The pupillary margin of the iris, lying as it does in close contact with the anterior surface of the lens, then becomes adherent to the latter and the adhesions, fibrinous in the early stages, eventually become organized by fibrous tissue. At this final stage the pupil is permanently and irremediably bound to the lens surface, but early instillation of a solution of atropine into the conjunctival sac is usually sufficient to break up the adhesions while they are still merely fibrinous. In cases, however, which have continued for some time without the use of atropine, instillations of this drug, even in strong solution, may not accomplish their purpose, and this in spite of the fact that fibrous organization has not yet taken place. It was found by Flynn that in such comparatively late cases a mixture of atropine, adrenaline and cocaine injected sub-conjunctivally is sufficiently potent to cause dilatation of the pupil. This mixture (to which it is necessary to add an extra reagent in order to prevent decomposition) is now known under the name of mydricain; it breaks down fibrinous adhesions with great rapidity and is a very valuable adjunct to ophthalmic practice.

CONTRACTED SOCKET

When the eyeball is removed by operation care is always taken to preserve the whole of the conjunctiva, so that a roomy epithelial lined socket capable of holding an artificial eye may result. It sometimes happens, however, that the conjunctiva is partially destroyed before the eyeball is excised, as in cases of severe injury, or that for various reasons contraction of the socket takes place after excision of the eye, because of the development of sub-epithelial bands of fibrous tissue. The restoration of a contracted socket has always been a difficult problem, and many methods have been suggested from time to time for its accomplishment, all of which are far from satisfactory. Gillies has recently described a method for which he claims a permanently successful result. It consists in the removal of the whole of the conjunctiva and its replacement by a Thiersch skin graft inserted into the socket on a wax mould. A clean dry cavity completely lined by skin is thus obtained, and the cosmetic effect is excellent, an artificial eye being worn with ease.

OTO-RHINO-LARYNGOLOGY

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THE EAR

PHYSIOLOGY OF THE EAR.—Certain advances of interest and importance have been made concerning the mechanism of that part of the internal ear concerned with orientation and sense of position. There is, however, nothing of direct value for the purposes of the present article. That part of the labyrinth concerned with hearing has received considerable attention, and results have been obtained which must have decided influence on the diagnosis and treatment of deafness. Important work has been carried out on the function of the saccule, but it has no immediate bearing; researches on the cochlea are, on the other hand, of particular interest. It is only of recent years that methods have been found with which to investigate the mechanism of hearing, except by deduction. The experimental method owes a great deal to the work of Wever and Bray. These investigators found that sounds carried through the middle ear to the auditory nerve could be picked up from an electrode applied to the nerve, conveyed to a loud speaker fitted with an amplifying apparatus and reproduced thereby with considerable fidelity. This method has allowed of investigation into the function of various parts of the middle and internal ear, with interesting results. For instance, fixation of the stapes, as it occurs in otosclerosis, is found to interfere with the conduction of sound.

Hallpike, by this method, has demonstrated the damping effect of the tensor tympani muscle. Much work of interest in various directions has been carried out on similar lines by Crowe and Hughson at Baltimore. By a different method, namely that of direct observation with an oto-microscope, Luscher has been able to see contraction of the stapedius muscle in response to various sounds, no doubt as a means of preventing the carrying in of excessively powerful vibrations to the internal ear. Using the Wever and Bray method, Hallpike has been able to demonstrate conclusively the localization of sound perception in the internal ear, sounds of high pitch being relayed from the basal coil of the cochlea, while those of low pitch have their maximum effect in the apical coil. By examining serial sections of the cochlea from dead patients, with previously investigated deafness, Guild and Crowe, with Bunch and Polvogt, have formed conclusions as to localization in the cochlea, but with somewhat equivocal results. It may be thought that no results, with direct bearing on the subject of the present paper, have been obtained by these investigations. Such is not the case, however, for already the possibilities of relief of extreme deafness have been carried a step farther as the result of these researches. Nylen and Zotterman have described a reversed Wever and Bray phenomenon, in which electrical impulses, picked up from a gramophone record, are carried to the ear of a deaf patient and interpreted with a moderate degree of accuracy. This gives hope of useful applications in the future.

Tests of hearing.—In the practical investigation of hearing, considerable use has been made of the audiometer, an instrument capable of reproducing pure tones of various pitches in amplitudes measurable in decibels. The instrument is of considerable use in testing the hearing of a number of subjects at one time, as, for instance, classes of children. In connection with tests for hearing, an alteration of opinion has been brought about as regards the participation of the cochlea in certain types of deafness, particularly presbyacusis and otosclerosis. By previous methods the cochlea appeared to be affected in certain cases, but if a monocord is applied to the mastoid process, so as to test bone conduction, it is found that in many such cases the internal ear is intact. The practical deduction is that electrical hearing aids, of the bone conduction type, may be of considerable service for patients of this type.

Otosclerosis.—Apart from the alleviation of deafness by bone-conduction aids, attempts have been made to arrest the condition. The late Albert Gray came to the conclusion, after extensive researches, that degeneration of trophic fibres in the auditory nerve might be the cause of the disease. To increase vascularity he recommended intratympanic injections of thyroxine. In early cases some good has been done in regard to preservation of hearing and alleviation of distressing tinnitus; advanced cases do not appear to respond favourably, owing, no doubt, to irremediable fixation of the stapes. An operation has been devised for the disease, following the lead of Holmgren and others; it has been modified and used extensively by Sourdille. The bony wall of the external horizontal canal is removed, so as to leave a window which is covered by a thin graft of skin; considerable improvement in hearing is obtained in some cases.

Acute mastoiditis.—The tendency in some violent forms of this disease is to delay operation and to treat the condition as one of septicæmia. Speaking generally, the consensus of opinion concludes that the most favourable time for operation is at the end of the second or during the third week. Treatment is carried out by injecting large doses of serum (e.g. 20 to 50 c.cm. of the anti-scarlatinal type), by giving pentnucleotide, or by simple or immuno-transfusion of blood. Recently, prontosil has become available as a therapeutic remedy, but insufficient data are available on which to form a judgment of its merits in otology. Infection of the middle-ear tract by the *Pneumoccus mucosus* gives rise to a dangerous form of mastoiditis, of an insidious nature; wide extension may occur without warning. Discovery of this type of infection calls for early and thorough operation.

Petrositis.—This condition has come into prominence of recent years and is now recognized clinically. In some cases of acute mastoiditis—after a thorough operation—discharge may be copious and persistent, and there may be, in addition, dull pain behind the eye, with some rise of temperature. The cause is suppuration at the tip of the petrous bone. Various operations have been devised. Kopetsky and Almour have described a route between the Eustachian tube and the internal carotid artery. Frenckner advocates drainage of the abscess through the loop of the superior semicircular canal; while others lift up the dura mater over the petrous bone and so reach the collection of pus. A number of cases recover spontaneously without any one of these special interventions.

Chronic suppuration.—The enthusiasm for operative procedures of a less extensive character than the radical mastoid operation has diminished to some extent, owing to recurrent suppuration in a proportion of cases. The more effective treatment of chronic suppurative otitis media has, of itself, reduced the necessity for radical operations. The use of muscle grafts to fill the bony cavity after modified operations has given good results, in selected cases. For chronic suppuration, associated with wide perforation of the tympanic membrane, the use of Sulzberger's powder—boracic powder containing 0·75 per cent. of iodine—has proved efficacious. Many surgeons employ ionization, but it is not a universal remedy.

Paralysis of the facial nerve.—The work of Ballance and Duel, extending over years, led to the evolution of an effective method of treating this dreadful complication of inflammation of the middle-ear tract. Previous methods of anastomosing the distal end of the facial nerve, either to the hypoglossal or spinal accessory, had the disadvantage of associated movements of the tongue or shoulder. By the Duel-Ballance method a nerve graft—best taken from the external cutaneous in the thigh—is laid into the opened facial canal to fit accurately between the divided ends of the nerve. Recovery is accelerated if the cutaneous nerve is divided *in situ* and is allowed to degenerate for ten days before transplantation. Perfect functional results have been obtained, but considerable operative skill is required if successes are to be obtained. If the facial muscles have lost the power of responding to nerve impulses, grafting is, of course, useless. In such cases the method used by Gillies and others, of inserting slings of fascia lata, is available.

Vertigo.—Advances have been made in two directions in the treatment of aural vertigo. Increase of labyrinthine pressure has been thought to occur and, to remedy this defect, water depletion and reduction of intake of sodium chloride has been found by Dida Dederding, to give good results. Sodium is said to cause water retention and its deleterious effects can be counteracted by giving ammonium chloride to the patient, as described by Furstenborg, Lashmet and Lalthrop. Injections of alcohol into the semicircular canals have been recorded by Mollison, with successful results.

NOSE AND PARANASAL SINUSES

Defences of the nose.—Considerable interest has been taken during recent years in the natural defences of the nose. Much work on ciliary action has been carried out by Gray, Lillie, Hilding, Proetz, Lowndes Yates and others, with results of practical importance.

The reaction of the nasal secretion in health and disease has also been the subject of much research by a number of investigators. It has been firmly impressed on the rhinologist that everything must be done to assist and nothing to interfere with the synergic action of the two factors of propulsive cilia and protective blanket of mucus. Therefore no strong antiseptics or irritating substances must be introduced into the nose; thymol, for instance, is detrimental to the action of cilia. The nasal mucus must not be washed away, nor must its reaction be changed from the normal p^H 7·4 or 7·6. In suppurative conditions the reaction of the secretions in the sinuses and nasal fossæ shifts towards acidity; in such cases the giving of alkalis, sufficient to render the urine alkaline, is of benefit, if combined with other suitable treatment. On the other hand, allergic conditions are associated with raised alkalinity; acid treatment may then be indicated and is often of help in vasomotor affections. Removal of ciliated epithelium is to be avoided, as it may be replaced by the squamous-celled type, or by scar tissue. It has been demonstrated by McGregor that regeneration of cilia may occur, but this possibility should not be used as an excuse for rough or unnecessary removal of epithelium.

The diagnosis of pathological changes in the lining membrane and contents of the *sinuses* has been advanced by improvements in radiographic technique. The methods described by Graham Hodgson enable a beautiful demonstration to be given of the thickening in the mucosa of various types; thus, polypoid enlargements may be revealed. X-ray photographs taken in the upright posture show the level of fluid, unless the affected sinus is full, when complete opacity is present. Caution must be exercised by the surgeon, however, in planning operations and deciding on their scope, as some X-ray pictures appear to reveal more extensive change than are subsequently found by direct inspection. The introduction of lipiodol into various sinuses before X-rays has been used to reveal abnormalities by filling defects and by changes in the time taken for emptying. The oil may be injected with a syringe or by the displacement method of Proetz. Such excellent films can be produced without previous injection that the use of contract media has not been generally adopted.

For the treatment of sinusitis Proetz's displacement method may be used to introduce various substances into the air cells and thus to re-establish drainage. Air is extracted from the cells by means of suction working through a tube in the patient's nostril, while he closes the soft palate by saying " K. K. K." Fluid, previously injected into the nose, will run into the sinuses to replace the air previously there, when the pressure is again allowed to return to the atmospheric level.

As regards operations on the sinuses, opinion has diverged in two directions, conservative and radical. In the former group are surgeons who do as little as possible and hope to help the patient by restoring the natural defences; on these lines intranasal antrostomy is preferred in most cases to more radical methods. Others think it necessary to remove the lining from the diseased maxillary, the ethmoid and sphenoid and even the frontal sinuses. The external operation advocated by Ferris Smith falls into this category and is drastic in its scope. The wise course appears to lie between the two extremes: to conserve as much as possible of the nasal contents and not to remove any except grossly diseased mucosa, while providing thorough drainage and ventilation of the sinuses. The frontal sinus requires special care in its operative treatment by the external route, as it is desirable to apply skin grafts to the exposed orbital periosteum, in order to prevent stenosis of the newly-formed fronto-nasal opening.

Chronic sinusitis has been regarded as the cause of mental disease in many patients. The researches of Pickworth have shown spread of infection to the cerebral blood-vessels. Excellent results have been recorded by Pickworth and Graves following treatment of such cases by surgical methods, but less encouragement is given by other observers. The treatment of chronic sinusitis by short-wave therapy has been warmly recommended, but in our experience the results are disappointing.

Vasomotor affections.—Good results have been obtained by Beckman in the treatment of hay fever and other allergic vasomotor disturbances. He gives nitro-hydrochloric acid and has a scientific basis for the treatment, as indicated above in describing the increased alkalinity of the nasal secretions in such cases. Zinc ionization has warm partisans for treating similar conditions. If used mildly and not as a means of destroying the ciliated epithelium, it is a method of value in cases which fail to respond to desensitization or acid-therapy.

PHARYNX

Tonsillitis.—Some surgeons have advocated complete removal of the tonsils under local anæsthesia in cases of acute tonsillitis associated with peritonsillar abscess. Their recommendations have not met with general acceptance. In the routine operation of tonsillectomy there has been a general tendency in this country to employ premedication before general anæsthesia. For children, nembutal, taken in orange juice, or paraldehyde given per rectum, are used, while for adults avertin is most suitable. The operation is then unaccompanied by preliminary apprehension or by severely unpleasant after-effects. There has been some disillusion as to the benefits of tonsillectomy in arresting systemic complaints; and consequently a diminution in the number of operations is to be noted. There is no doubt, however, that if well carried out, and with suitable indications, few operations of surgery give better results.

THE LARYNX

Laryngeal obstruction.—With regard to treatment of cases of double abductor paralysis, various suggestions have been put forward. Patients who cannot open the glottis are, of course, in a very bad position, because the entrance of air into the lungs is much obstructed. Various attempts have been made to overcome this disability. Ballance and Colledge carried out many experiments on anastomosis of the phrenic nerve to the recurrent laryngeal. This method has been applied to human beings, with some relief. Rethi, in Budapest, has evolved an operation in which the larynx is opened from the front as in laryngo-fissure. The mucous membrane covering the joint is incised and the attachments of the crico-arytenoid joint are separated. The sphincteric muscles which pull the arytenoid forward and close the glottis, are divided. The result of this operation is said to be satisfactory, but the occasions on which it can be used are few. Another method is to displace the vocal cord downwards so that the glottis opens in the transverse instead of in the vertical direction, as suggested by Wittmaach. The opinion of others, amongst which is that of St Clair Thomson, tends to the treatment of such cases of permanent tracheostomy. If a cannula is inserted into the trachea correctly and at a low level, the patient can live a very comfortable life. A small valve is fitted into the cannula, designed to open inwards and allow air to enter freely, but to close during expiration, so that air passes out through the glottis and enables the patient to speak in a normal manner. The disadvantages of permanent tracheostomy have been much exaggerated, and it is found in practice that a tube, correctly placed, is of little discomfort to the patient and does not necessarily make him more liable to respiratory disorders than if he had no opening at all in the neck.

The cause, in other cases of laryngeal stenosis, is incorrectly performed tracheotomy, with injury of the cricoid cartilage, resulting in perichondritis. In certain cases the vocal cords become fixed together, so that the glottis is made very small. In these patients, again, permanent low tracheostomy may be the most suitable method, but, in some, success may be obtained by opening the larynx, separating the adherent parts and inserting skin grafts.

Malignant disease.—Carcinoma of the larynx is relatively common and a great deal of attention is directed to it. The three methods of treatment used are surgical excision, radium, and deep X-ray therapy. Experience leads to the conclusion that it is best to have an open mind and to adopt the most suitable treatment for each case, and not to be confined rigidly to any one method. In cases of carcinoma limited to the anterior end of one vocal cord, excellent results are obtained by laryngo-fissure. The patient has little danger from the operation and recovers quickly; subsequently he has a useful voice which, although rough, serves for all the purposes of life. For some extensive cases the modified operation of Hautant and Ombredanne is useful. If the growth affects one vocal cord only, but is too extensive for this operation, it may be suitable for the interstitial insertion of radium. Advances have been made in the technique, and now the habit is to remove the greater part of the ala of the thyroid cartilage together with the upper part of the cricoid cartilage. Six to eight needles, 4 cm. in length, are inserted as a palissade at the side of the larynx, and in suitable cases excellent results are obtained if the technique is sufficiently exact. In cases which are too extensive for this method, because the growth has spread on to the opposite vocal cord, complete removal of the larynx may be indicated. The adoption of a new incision, used by Gluck and Sorensen in Berlin, has led to improved results.

Successes in the treatment of carcinoma of the larynx by X-ray therapy have been obtained by Coutard in Paris. His method of treatment differs from that of others, as he uses a protracted fractional method. The patient has repeated irradiations, not very strong at each application, but continued over a long period, often running into months. The rationale of the treatment is that if big doses are given the carcinomatous cells become resistant, but if small doses are applied the radio-sensitivity is retained. The skin reaction is often severe and the general discomfort of the patient may be considerable. The method requires persistence on the part of both the radiotherapist and patient. Teleradium is being tried at various centres and it may be hoped that good results will be given. From two to five grammes are required for a unit.

THE BRONCHI

Foreign bodies.—Advances have been made in the extraction of foreign bodies from the bronchi. In Chevalier Jackson's clinic in Philadelphia cases which years ago were impossible of removal, have now been dealt with successfully. This improvement in technique applies particularly to small objects such as pins in the periphery of the lung, where they are naturally out of sight even if the smallest bronchoscope is used. By the use of the costo-phrenic bronchoscope and special pin-bending forceps, Chevalier Jackson has been able to get almost 100 per cent. of success.

Malignant disease.—The subject of carcinoma of the lung is one of great interest, as the disease appears to be increasing. The importance of early diagnosis must be emphasized, as it is possible in some cases to get satisfactory results. The great majority of carcinomas of the lung begin in the wall of the bronchi and some can be removed if discovered sufficiently early, before invasion of the lung and its parenchyma has taken place. Radon may subsequently be applied to the base. It is held in a special form of container designed by Tudor Edwards; modifications have been made in its size and in the method of retaining it in the bronchi, a spring being fitted on either side to press against the walls. Thoracic surgeons are now able to remove a lobe or even the whole lung without excessive danger, but it still remains for the laryngologist to examine suspected cases. If such cases are referred to him, there is no doubt that more of these small limited growths will be found, with a possibility of cure by simple measures.

Broncho-spirometry.—Interesting work has been done by Jacobæus and Frenckner in Stockholm, who have used a special bronchoscope, so designed that the air from each lung can be collected and examined as to quantity and composition; the method is known as pneumo-spirometry. Frenckner has designed for this purpose a flexible bronchoscope with considerable possibilities.

THE ŒSOPHAGUS

Malignant disease.—Advances in the examination and treatment of diseases of the œsophagus are concerned mainly with carcinoma; this distressing disease is relatively frequent, and many attempts have been made to obtain a cure. Grey Turner has described one case in which the whole œsophagus was removed by a combined cervical and abdominal operation; later a new œsophagus was made in front of the chest wall, partly by forming a tube of skin and partly by drawing up a loop of small intestine, and the patient was able to swallow in a practically normal manner.

A few cases of excision have been described by other surgeons, but patients are seldom suitable for this operation and in the majority palliative treatment is all that is possible. The insertion of seeds of radon, screened in gold, gives considerable relief. Some patients who come with great difficulty in swallowing, have been enabled to live a practically normal life for a year or more and to take an ordinary diet. Deep X-ray treatment has been used for these cases, but the difficulties are considerable; the rays must be extremely hard, and there is found to be danger of injuring the lung tissue. It is possible, however, that with improvement of technique better results may be obtained.

Œsophagectasia.—The condition generally known as cardiospasm has attracted the interest of a great number of physicians, surgeons and laryngologists. Many theories have been put forward as to its causation, and a considerable number of forms of treatment have been adopted. Recently Knight has carried out researches on cats and has come to the conclusion that the condition, in some cases, is due to excessive closure of a sphincter under the control of the sympathetic nerves. By removing the sympathetic fibres around the cœliac axis arteries, the sphincter has been caused to relax. The practical application of the method to man is not, so far, encouraging.

Congenital shortening.—Certain cases of dysphagia have been found by Brown Kelly to be due to maldevelopment of the œsophagus, which ends at about the level of the seventh thoracic vertebra and is there joined by the stomach. Repeated dilatation and, in rare cases, external operation are required.

ORTHOPÆDIC SURGERY

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INJURIES AND DISEASES OF JOINTS

SHOULDER.—Certain displacements in the neighbourhood of the shoulder are commonly neglected with consequent lasting disability. Of these one of the less important is dislocation of the acromio-clavicular joint. Wakeley[1] draws attention to this subject and relates five cases in which lasting beneficial results were obtained by operative treatment. The dislocation of the clavicle upwards is normally prevented by the strong coraco-clavicular ligament. If this is ruptured the X-ray will generally show a flake of bone which has been torn from the inferior surface of the clavicle. Any recent case of this injury should be treated by placing a pad over the clavicle and a strong strap over this and under the elbow. It is in neglected cases, however, that operation is required. Wakeley's suggestion is the placing of a stout silver wire horizontally through the ends of both clavicle and acromion. It would be more in accord with modern principles if a sling of fascia was passed beneath the coracoid and over the clavicle in order to replace the torn ligament. A rarer deformity of the shoulder is congenital in origin and that known as Sprengel's shoulder. In this the whole arm and limb girdle are raised on one side with the result of an ugly and crippling deformity. Scaglietti[2] has described Putti's method of dealing with this condition as seen in four patients aged 4½, 6, 13, 13 years. The scapula is exposed by a curved dorsal incision, the trapezius turned aside and the bridge of bone which unites the raised scapula to the spine is cut through and totally removed. The scapula is pulled down to a normal level and anchored by stout catgut stitches to the fascia of the back and to the ribs.

The hip.—Tuberculous disease. The ultra-conservatism in the treatment of tuberculous joints which dominated surgical practice for the past generation has now largely given place to operative methods. This is due to several factors. The period which conservative treatment requires for success is known to be so much longer now that more accurate tests of recovery are available. Whereas it used to be said that a tuberculous hip took one or two years to recover, it is now known that four to seven years must be allowed. X-ray examination in many cases has demonstrated that the articulation is destroyed and therefore can never function as a joint, and thirdly certain cases which have seemed to do well after several years of conservatism relapse immediately function is resumed. For all these reasons therefore most surgeons advise some sort of internal fixation of the joint in the majority of cases of tuberculous hip disease. The choice of cases for operation is important. After a period of six to thirteen months' conservative treatment, if the X-ray shows the articular surfaces to be clear and healthy, recovery with a mobile joint may be confidently expected. But if in spite of rest the joint surfaces are eroded and the bones invaded then an extra-articular arthrodesis is done. Richard[3] describes a technique suitable for children in whom the great trochanter has not yet ossified. A thin layer of the outer table of the iliac bone, with its periosteum attached is turned down so that the apex of the bone flap can be incorporated with a split in the trochanter. The limb is put up in plaster and the patient allowed to walk after four months.

Osteoarthritis of the hip.—The pain and disability associated with this condition offer a challenge to surgeons for efficient treatment. At present most cautious practitioners are content with advising some type of walking caliper together with various kinds of physiotherapy.

Page[4] advocates an arthrodesis for monarticular cases but McMurray[5] and Malkin[6] both consider that a sub-trochanteric osteotomy will serve the purpose. Arthrodesis of the hip is a difficult operation, particularly when applied for the fusion of an osteo-arthritic joint. The bone surfaces are eburnated and non-vascular and are very reluctant to fuse. And furthermore it causes considerable shock, which makes it dangerous for an elderly or feeble patient. Osteotomy on the other hand is easy and comparatively trivial. McMurray considers that a definite " bifurcation " of the upper end of the femur should be done, so that the upper end of the shaft shall take bearing below the trochanter. Malkin regards the value of the operation as consisting chiefly in giving fresh alinement to the femur which has been adducted and everted. Another great advantage of osteotomy over arthrodesis is that what movement there is in the hip joint is preserved.

Congenital dislocation.—Opinion is still sharply divided about the best method of treatment of this condition. On the one hand bloodless manipulative reduction gives an excellent functional result if it can be applied early enough. But after the age of four or five years manipulative reduction is extremely difficult and it is doubtful whether or not it is ever anatomically correct. The capsule may be torn or doubled upon itself, so that a thick pad fills the already shallow acetabulum. For this reason most surgeons are content to use the closed method for early cases, but employ open operation for older children. By following these principles the American Orthopedic Association have shown that about 75 per cent. of the cases can be cured, as judged by normal function. But Heyman[7] has done good service in pointing out that the great majority of the cases which show functionally good results are by no means anatomically perfect. The head of the femur is usually flattened, the neck is short and thick and the acetabulum shallow. Nearly always there is a marked disproportion between the large head and the shallow socket. Only from 10 to 20 per cent. of cases show anatomical cure, i.e. a normal joint. Closed reduction done at an early age is much more likely to produce a normal joint than any open reduction done at a later date. However good the functional result may be in the latter cases, it is highly probable that in adult life painful osteoarthritic symptoms will arise.

Knee.—Flexion contracture of the knee arises from a number of causes, e.g. arthritis, paralysis and injury, and its treatment is always a matter of some difficulty and anxiety. This is due to the great mechanical advantage which the flexors have over the extensors, to the contracture of fascia and ligaments at the back of the joint, and to the tendency of the tibia to undergo backward dislocation if force is applied to correct the flexion. Hitherto the method which has given the best results is the wedged plaster cast. But if the flexion is pronounced this method is liable to cause backward displacement of the tibia. Haggart[8] has devised a method which seems to be most effective. It consists in skeletal traction applied to two points simultaneously, the head of the tibia and the os calcis. Each of these bones is perforated by a Kirschner's wire. The tibia is pulled downwards and forwards with a weight of 5 to 7 lb. and the os calcis downwards in the axis of the limb with a weight of 10 to 18 lb. This method has two great advantages over that of the plaster cast. It pulls directly on the tibial head, so that backward dislocation is prevented, and the limb being free from covering all the time is open for massage and other forms of physiotherapy. When the knee has been straightened by this method, the leg is placed in a posterior plaster cast for a time and this is succeeded by a walking caliper. Its use is continued for six months, and in the latter part of the period it is only worn at night.

In this country there has always been great hesitancy about attempting to mobilize the ankylosed knee, but in Italy and Germany the operation of arthroplasty for the knee has a recognized place. Payr and Essbach[9] publish a series of cases of knee ankylosis due to gonorrhœa with a large proportion of successes. Great stress is laid upon a long and careful preliminary treatment in order to ensure that active infection is at an end. Merely waiting for one or two years is not enough—local reaction tests, skin temperature, reaction to stimulation by massage, and X-rays are used. The focus of infection, cervix, prostate, seminal vesicles, and posterior urethra are carefully examined and treated. It is much better to wait for bony union than to operate at the period of fibrous ankylosis. It is often wise to do a preliminary operation to free the rectus tendon and patella from the bone, placing fat grafts beneath them and leaving the bone plastic operation to a later date.

Internal derangement of the knee is still a matter of controversy; when the straightforward cartilage lesion is simple, its treatment is satisfactory, but there still remain a small proportion of cases in which both diagnosis and treatment are in doubt. Pannett[10] advocates a definite exposure of the posterior half of the semilunar cartilage in all doubtful cases. He points out that only in this way can the condition of the hinder half of the meniscus be examined and that the complete removal of this part of the cartilage can be readily effected without trauma to the joint or injury to the collateral ligament. Endeavours are constantly being made to see inside the knee joint without an open exposure. Naturally it is by means of X-rays that such progress can be attained. For some years now attempts have been made to produce arthrographs of the knee by means of various kinds of contrast filling. In this country the best results have been obtained by filling the joint with air or oxygen. Lately in Germany various workers have claimed good results after the use of radio-opaque fluids of which abdrodil and uroselectan are the most satisfactory. Carrigiani and Pirker in Vienna[11] and Stocker in Graz[12] claim that this method represents a great advance in diagnosis. The figures produced by these authors are all of great interest, but it is evident that a large experience of the method with normal and abnormal knees will be needed before any observer can use it.

Foot.—In the treatment of bunions and the other deformities associated with hallux valgus there is still some discussion as to the best method of treatment. The majority of surgeons consider that partial or total removal of the head of the first metatarsal is the essential for success. Lately an old method of approach, first suggested by Petersen as long ago as 1888, has been revived and with modern methods of asepsis it should give good results. Breck[13] gives a good and well-illustrated account of this with a list of 129 cases in which it has been used. The method consists in making an incision in the web between the first and second toes, dislocating the great toe towards the medial side, freely exposing the head of the first metatarsal and chiselling off the exostosis. McBride[14] makes use of the same method of approach and exposure, but he also removes the lateral sesamoid bone and transplants the adductor hallucis from the base of the phalanx to the neck of the metatarsal. Sidler[15] suggests that certain cases of pain in the forefoot in young adults are due to an osteochrondritis dissicans affecting the sesamoid bones of the great toe. Apparently this accounts for some cases which are now regarded as bipartite or fractured sesamoids. He claims that the removal of such a fragmented bone will relieve the painful condition.

MANIPULATIVE SURGERY

This, the very oldest of the arts of the surgeon—literally his handicraft—after suffering a long eclipse of interest in the teaching and practice of medicine is now gradually coming to take its proper place. Very significant of this are two recent events. The appointment of a manipulative surgeon to the King's Household (Sir Morton Smart) is the first of these and it indicates that the most highly placed in the land recognize that bloodless surgery is an every day necessity and most fortunately also recognizes that orthodox medical training and qualifications are no bar to this art. In the past there can be no doubt that the greatest skill in the art of "bone setting" has been found amongst the ranks of the unqualified practitioners. The other event which would have been incredible a few years ago was the invitation to Sir Herbert Barker to give a demonstration of his methods before the British Orthopædic Association. This took place at St. Thomas's Hospital and the crowded audience testified to the great interest of the occasion. The famous manipulator dealt with about 20 cases in the space of two hours. Most of these had been collected from the out-patient department of the hospital and a few by Sir Herbert himself. They included the following types :—

Shoulder.—Recurrent dislocation and stiff shoulder. *Elbow.*—Tennis-elbow—several cases. *Wrist.*—Subluxation of inferior radio-ulnar joint. *Hip.*—Stiff hip after dislocation. *Knee.*—Sprain, displaced cartilage (several cases), chronic arthritis. *Foot.*—Painful flat foot, hallux rigidus and arthritis of the great toe. *Back.*—Low backache, lumbo-sacral pain, sacro-iliac strain.

Each case was briefly introduced, the diagnosis having been settled by previous examination. The manipulation proposed was demonstrated and then in most cases the patient, sitting in an arm-chair, or lying on a couch, was anæsthetized by gas and oxygen. The manipulation was carried out, and the patient recovered consciousness and usually expressed him or herself as feeling much better. Each manipulation was characterized by great precision, powerful force, and usually by a very jerky movement—as though to break rather than stretch adhesions. Such jerks were often accompanied by audible " clicks " as the adhesions gave way. Two examples will suffice to show the method at its best.

(1) A man of 35 suffered from a " tennis-elbow " of his right arm. The arm was held with the elbow in extreme extension. Forcible hyper-extension was then made in three positions, with the hand supinated, semi-pronated and fully pronated. Each movement was a forcible jerk using the forearm as a lever, the elbow resting on the operator's knee.

(2) A woman of about 42 who had had pain in the lower back and pelvis since the birth of her last child. Her case had been diagnosed as sacro-iliac joint strain. In this and in similar cases the whole manipulation was done without anæsthesia, but the pain caused did not seem excessive. She was first laid on her face and the lower spine, sacrum and posterior iliac spines palpated. The spine and sacrum were first jerked forwards in several places, the spine was rotated by holding the pelvis down with one hand whilst the shoulder was lifted and pushed over with the other. Each leg was raised from the bed in as much hyper-extension as could be borne, then both legs were raised together in the same way. She then lay on her back. Extreme flexion of each hip with abduction was carried out. As a final act the woman was lifted by her pelvis and jerked backwards.

The manipulation of the joints, e.g. stiff shoulders, knees and feet, does not call for any special comment. The rationale of the treatment of recurrent dislocations, e.g. that of the shoulder and the semilunar cartilages, was obscure and how forcible manipulations calculated to break down adhesions could at the same time confer stability on the joint remained a mystery. There can be no doubt that although the value of manipulative surgery is acknowledged by all authorities it is neither practised nor taught in the medical schools as it should be, and it is to be hoped that the demonstration will go some way towards emphasizing the need for reform in this matter.

FRACTURES

By far the most important advance in the treatment of fractures has been the recognition of the importance of organization. This was proved during the War and emphasized by Sir Robert Jones and others, but until the Report of the Fracture Committee of the British Medical Association[16] appeared it was not generally accepted. Unity of control, continuity of treatment and an accurate follow-up must be instituted in all large hospitals. Even if this should require (and it certainly will) the payment of whole-time surgeons and clerks to do the dull routine work, it will bring about the reduction of the period of disability to one-third and the percentage of permanent disability by thirty per cent. Alongside of the more general recognition of the need for organization has been a wide acceptance of Böhler's teachings.[17] These consist in the accurate reduction of displacement under X-ray control, efficient splinting, usually by unpadded plaster, active exercises from the moment that the fracture has been fixed and the abolition of passive movement with massage, during the period of union of the bones.

In regard to individual fractures, those affecting the neck of the femur are attracting most attention. Since Smith-Petersen introduced his flanged steel nail six years ago, this device has steadily gained in favour. But now it still remains to be decided which is the best way of introducing the nail in the correct position. Sven-Johanson seemed to have solved this point when he made a nail with an axial canal and then placed several Kirschner's wires into the femoral neck, chose the one in best position and drove the nail into the bone over the wire guide. But the method has not proved so simple as it sounded and bending wires, repeated X-rays, and the great time consumed made the operation difficult and tedious. Watson Jones[18] has worked out a good technique and reported a series of over 60 cases. He makes an open exposure, uses a stout drill as guide, places this under direct vision and then hammers the nail over the drill. But even this is a formidable undertaking for a feeble or elderly patient. Eric Lloyd[19] has invented an ingenious instrument like a sextant by which the drill guide can be correctly placed without an open incision. The author of the present article[20] has designed a drill guide which with preliminary X-ray control can ensure the proper placing of the pin by a blind operation which can be done under gas and oxygen anæsthesia in about eight minutes.

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DISEASES OF CHILDREN

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DISORDERS OF THE NEW-BORN

THE past year has seen an increasing dissatisfaction with the mortality rate in the early weeks of life. A discussion at the Royal Society of Medicine in March, 1936, showed clearly that, despite the amazing fall in the infant mortality rate in the past fifty years, there has been comparatively little improvement in the death rate in the first month of life when as many babies die as during the remaining eleven months of the first year. Prematurity appears to be one of the most important causes of death in the first month, and an attempt to improve the general management of this type of baby might well lead to dramatic improvement in the neonatal death rate. In Chicago an effort has recently been made to deal with the problem of the premature infant on a broad scale and the municipal health authorities have acted in close co-operation with the pædiatricians. Premature births have been made notifiable within the shortest possible time after delivery, and the main points stressed are expert nursing care, the supply of warmth, institutional management when necessary with properly equipped accommodation and a supply of human milk. While it is obvious that there are many criteria to be taken into consideration in the diagnosis of prematurity, it seems to be generally agreed in American and continental literature that the simplest standard is to accept babies weighing 5½ lb. or less. If such a standard were universally adopted a collection of comparative statistics might then usefully suggest lines upon which the problem might be solved. Mention was made in the corresponding contribution to this series last year of certain detailed points in the management of the premature infant, such as the temperature and humidity of the environment and there is little fresh to report in this connection. The use of œstrin as a stimulant to the metabolism of the premature infant, advocated optimistically especially in Germany, has been shown by a carefully controlled test in this country to be of little real value.[1] The administration of thyroid gland for such a purpose is still under trial and results so far reported with small groups of infants suggest that it is likely to prove useful.

Regarding *respiratory difficulties* in the new-born period every publication of the past twelve months has emphasized the need for extreme gentleness and the danger of every form of artificial respiration as usually practised. Barcroft[2] and his colleagues at Cambridge are gradually elucidating some of the mysteries concerned with the first breath of the new-born baby and since they appear to have proved that oxygen-want is the dominant cause of the primary inspiratory " gasp " a logical deduction from their experiments is that prompt clamping of the cord as soon as possible after delivery is likely to accelerate the first breath of the baby. The small amount of blood " lost " to the infant by such a procedure, which does not wait for the orthodox cessation of pulsation, is no great disadvantage in view of the physiological blood destruction of the early days of life. A secondary consideration from Barcroft's work is that premature inspiration, before the head is fully delivered, may come about from pressure on the cord and the inhalation of mucus and other material into the respiratory tract before delivery is an important factor in delaying the onset of full independent respiratory function. Mention was made last year of a method of aspirating material from the respiratory tract in such cases. A simple point recently made for the management of this type of respiratory difficulty concerns the " head-low " position. Blaikley and Gibberd[3] have described an " inclined receiving table " to which an infant can be strapped but, as they admit, no special apparatus is necessary. Babies who appear to have mucus and other foreign material in the mouth or pharynx with delay in respiration or feeble respiration when once started should be kept with the head lower than the trunk, wrapped in a warm blanket, and other methods of resuscitation such as adequate cleansing of the pharynx can be carried out in this position. Such an attitude precludes the popular warm bath as a means of resuscitation and this is in fact condemned by the authors. Another possible cause of respiratory difficulties in the new-born recently discussed concerns the effects of anæsthesia given to the mother, a point of some importance in view of recent developments in which the public is greatly interested. N. J. Eastman[4] concludes that neither chloroform nor ether has any appreciable influence upon the fœtal blood oxygen, but nitrous oxide anæsthesia produces definite changes. An adequate saturation of the fœtal blood with oxygen cannot be guaranteed unless the mother receives 15 parts of oxygen in every 100 parts of gas mixture. Particularly after a long labour babies stand anoxæmia badly and it is dangerous to shut off the air or oxygen supply in order to deepen the anæsthesia towards the end of such a labour. Modern analgesia apparatus, properly used, does not permit of such strong gas mixtures.

Skin infections in the new-born period are apt to prove troublesome in maternity institutions and may, in the case of fully-developed " pemphigus," lead to a fatal epidemic. Carter and Osborne[5] suggest that when the general hygiene of a maternity unit is running satisfactorily a possible source of infection for the skin is the " clean clothes " coming from a laundry where workers have infective lesions on their hands. Early treatment of any blisters is recommended as the best way to secure prevention of serious pemphigus. The blister fluid is evacuated by means of a fine capillary pipette and 20 per cent. silver nitrate introduced. An antiseptic dusting powder is placed over the lesion and the infant's hands secured to prevent scratching.

Ophthalmia neonatorum was discussed this year at the Annual Congress of the Ophthalmological Society of the United Kingdom. From the prophylactic point of view it appeared to be agreed that silver nitrate still held the field as the most reliable substance used, although there is some difference of opinion as to the strength which should be employed. In many cases ½ per cent. is popular and with 2 per cent. solutions more examples of irritant inflammation of the eyes result. Nevertheless the weaker solutions cannot be guaranteed to prevent gonococcal infection and it is best to use 1 or 1½ per cent. with care to avoid excess. Skilled treatment of ophthalmia in conjunction with eye hospitals or special institutions appears to be definitely reducing the incidence of subsequent severe impairment of vision.

Urinary infection in the new-born period is a subject which has been little studied. Craig[6] has reported a large series of cases in which the clinical picture was characteristic. An indefinite onset in the early days of life, often when there has been an intracranial injury, of fever, anuria with the gradual development of restlessness, thirst, and sweating suggest pyelitis and diuresis must be promoted. Extra fluid—in addition to breast feeding when the child's condition permitted—in the form of water or weak tea is advocated, and alkalis, such as sodium or potassium citrate, should be given, beginning with 16 to 20 grains in the first twenty-four hours and adjusting the dosage subsequently to produce alkalinity of the urine. Castor oil for the bowels and warmth to the loins is also advised.

Jaundice in the new-born in its severest forms has been shown to be closely related to problems of blood formation and destruction in the fœtus. For the prevention of icterus gravis, especially when definitely familial, it has been recommended[7] that the mother should receive 100 grammes of liver daily during the last ten weeks of pregnancy. This is based upon analogies between the blood findings in babies with icterus gravis and those of patients recovering from pernicious anæmia under the influence of effective liver treatment. The best curative treatment of severe forms of jaundice is still the prompt injection of human blood serum intramuscularly, or, if the disease is not rapidly controlled, a blood transfusion.

NEW DISEASES

Epidemic cervical adenitis is the term given to a malady occurring chiefly among children which has appeared in the last two winters. Miller[8] stresses the sudden occurrence of high fever, with or without a rigor, and the rapid development of pain in the neck from inflammation and swelling of the tonsillar and other lymphatic glands. Local changes in the throat remain comparatively slight, but a rapid spread of inflammation throughout almost all the cervical lymphatic glands occurs, taking some weeks to disappear completely. Rigors continue to appear in many patients, but the malady comes to a satisfactory ending despite the anxiety caused during the acute phases, the worst being over by five to ten days. Simpson[9] has reported two small " house epidemics " and in his patients rigors were less often present but alimentary symptoms occurred. The incubation period appeared to be about six days or less. Treatment should consist of an attempt to disinfect the throat, together with the administration of potassium chlorate, sodium salicylate and sodium bicarbonate internally.

Epidemic nausea, occurring in widespread outbreaks in Denmark recently, has apparently made its appearance in this country, for under this title Miller and Raven[10] have described an extensive epidemic in an English boarding school. The symptoms of the disease consist either of vomiting of sudden onset or of nausea, to which was added in a quarter of the cases the sensation of giddiness, sometimes of considerable severity. The illness ran a short afebrile course, all the patients with one exception recovering completely within forty-eight hours. Despite the mildness of the clinical features the epidemic attacked about half of the total pupils at the school and one-third of the adult population within fifteen days. The incubation period appeared to be from two to four days in most cases, although it was as long as eight days in one instance. The etiology is obscure although the possibilities appear to be limited to an alimentary tract infection or a virus disease of the central nervous system. Treatment consists of withholding all food for the usual period of four to six hours when the nausea and vomiting are present, and then a gradual start is made with clear fluids, proceeding to light diet by the second day. No medicines appear to be necessary.

Virus meningitis is suggested as a suitable name for what has been described under various titles in recent years, the most popular being " acute aseptic meningitis," of which some examples were recorded in a recent number of *The Practitioner* (August, 1936, cxxxvii, 219). Although not confined to children this disease produces the greatest difficulty in diagnosis at the younger age periods because of its similarity to tuberculous meningitis. Recent work in America, brilliantly confirmed by G. M. Findlay and others[11] in this country, suggests that it is an acute infection of the nervous system by a virus conveyed by healthy mice. Clinical examples of the malady have been reported from houses over-run with these animals, suggesting an important point in prophylaxis. The most important feature in diagnosis from tuberculous meningitis lies in the chloride content of the cerebrospinal fluid. Probably if this remains above 650 mgm. per 100 c.cm. in the presence of a lymphocytic reaction and, of course, in the absence of tubercle bacilli, it is justifiable to hold out hope of recovery, i.e. that the disease may be virus meningitis. Investigation of the serum of patients who have recovered from the disease indicates the presence of immune bodies and hence the use of convalescent serum in treatment would appear to be worth consideration.

GENERAL COMMENTARY

The bottle-feeding of infants.—This matter was discussed at the Melbourne meeting of the British Medical Association last year and there has also been a certain amount of spasmodic correspondence on the subject in the columns of the medical press. Roughly speaking, there appear to be two schools of thought: (1) One holds that for the first nine months or so of life any cow's milk mixture given to the baby must be of the same percentage composition as human milk—the so-called "humanized" milk system. This system is definitely rigid, is open to the risk that simple dilution may be carried out without the necessary additions of sugar and fat and, according to some of its critics, gives the infant a poor supply of certain of the essential amino-acids. (2) According to the other main method of infant feeding, such dilute mixtures as equal parts of milk and water are abandoned after the early weeks of life in favour of 2 : 1, 3 : 1 and even stronger mixtures with the simple addition of sugar. With the use of dried milks such mixtures become even stronger as the child reaches three months of age, and indeed, whole cow's milk (modified by heating, i.e. boiled, condensed or dried) plus added sugar appears to suit a large proportion of normal infants. The balance of the discussion and correspondence alluded to was in favour of the stronger milk mixtures and definitely critical of " dogmatism " regarding bottle-feeding. It is obvious that each individual baby may need to be fed in a slightly different manner to secure success, but unfortunately while gross overfeeding usually demonstrates its evils at once, gross underfeeding may not indicate its occurrence for some weeks and minor degrees of underfeeding may continue for months. More and more medical practitioners dealing with infant-welfare work are using stronger milk mixtures, especially those consisting of nearly whole milk plus lactic acid and it is claimed that infants fed in this way more closely resemble breast-fed babies in their " general vigour and resistance to infection . . . than do those on diluted milk mixtures."[12]

"*Acidosis attacks.*"—Although there may well be little harm in differences of opinion among the profession on infant feeding, it is a different problem with another disorder often considered as closely related to diet, namely, so-called attacks of " acidosis." It is easy to attribute these upsets to excess of fat and to prescribe glucose with a fat-low diet. The scientific facts of the case do not support this facile view, which, moreover, is fraught with danger. Experiences of recent years with the use of ketogenic diets in childhood (e.g. for pyelitis) have demonstrated conclusively that it is possible to load a child with fat until the urine contains copious quantities of ketone bodies and yet no symptoms develop—certainly no vomiting. Thus the cause of " cyclical vomiting " must be sought elsewhere, and Paterson[13] sums up modern views by suggesting that in " acidosis attacks " there is a mild infective hepatitis with a focus of infection, usually in the throat or ear, as a primary cause. He strongly deprecates the curtailment of fat in the diet save during the actual acute attacks and stresses the urgent need for the administration of glucose, either in its fluid form or as a powder by the mouth, or with saline subcutaneously, rectally or intravenously in all acute attacks if the vomiting is at all severe. Sodium bicarbonate is not advisable after the vomiting has begun. The danger of diagnosing " acidosis " lies in the fact that some serious organic disease may be present and mistakes have been made over such maladies as appendicitis, meningitis, pyelitis, pneumonia, abdominal tuberculosis and intestinal obstruction as in volvulus or intussusception. Between the attacks a well-balanced diet will help to maintain a good standard of nutrition and increased resistance to the type of catarrhal infection which starts off the syndrome.

Early diagnosis of scurvy.—Mention was made last year of the treatment of infantile scurvy by means of synthetic vitamin C. Clearly early diagnosis is important if all cases of this disease are to be saved, and work upon this aspect has proceeded along two main lines. On the one hand the chemical tests for vitamin C in the urine have been perfected and it appears to be possible to establish a diagnosis of scurvy by this means. A more prompt result can, however, be obtained by careful X-ray studies of the limb-bones. E. A. Park and his associates in their contribution to the " Barlow Birthday " volume of the *Archives of Disease in Childhood*[14] indicate that changes can be detected, especially at the wrists and ankles, in the earliest stages of the disease long before periosteal hæmorrhages or changes at the epiphysial line can be seen. The type of lesion to be looked for is a defect at the outer corner of the lower end of the radius, beginning as a slight " fuzziness," but in slightly later cases, showing as a " cleft " running into the bone more or less between the epiphysial line and the rest of the shaft. The same study emphasizes that probably the earliest clinical sign of scurvy as it affects the skeleton is represented by the changes at the costo-chondral junction where a characteristic angular deformity develops, most marked in the fifth, sixth and seventh ribs.

Pink disease.—Although by no means a new malady nor one for which great diagnostic or therapeutic advances can be claimed in recent months, this disease will be briefly touched upon in conclusion because it appears to be recognized far more seldom than its real incidence warrants. Practitioners from obscure and outlying districts have more than once after seeing a typical example of this malady at a children's hospital returned to their practices to make a diagnosis in children who had previously produced a baffling picture (personal communications). Moreover, the paper presented before the British Medical Association at Melbourne by A. Jeffreys Wood and Ian Wood[15] (published within the past twelve months) has summed up the facts about pink disease in an excellent manner. The malady usually begins with an acute phase characterized by a coryza, fever and general malaise occurring in a child between nine and eighteen months. Following this, sleep becomes greatly disturbed, severe anorexia develops and mental misery is profound. Muscular weakness is also marked, sweats are common, and about a month from the onset a rash appears, sudaminal in type, with some degree of " pinkness " and slight œdema of the extremities. Photophobia and itchiness occur, the child biting its fingers and clawing frantically at any exposed part of the skin. Stomatitis is frequently present and occasionally this is severe enough, together with gingivitis, to dominate the picture. A peculiar "mousy" odour in the breath is described and teeth may be shed. The first sign of the disease in rare instances has been the passage of teeth in the fæces! The duration of the malady to the full development of symptoms is usually about eight to ten weeks and in favourable cases improvement then begins. For further diagnostic points and a discussion on the still obscure etiological factors the original paper should be consulted. Treatment is handicapped by lack of knowledge of the causation of the disease. Fresh air, light clothing with silk or cotton next the skin and adequate and frequent toilet of the skin (baths followed by spirit applications and plentiful powdering) are the most important points. Diet should be as liberal as the child's anorexia will allow, and much coaxing may be necessary. Vitamin concentrates of all varieties are vaunted by some workers and may be given. Prof. R. A. Peters (personal communication) considers that results with the B_1 concentrates in certain cases of pink disease have been encouraging and this I can confirm. With a special preparation kindly supplied by Prof. Peters I have seen some patients improve remarkably one week after a large single dose. Sedatives such as chloral and bromides may be used to relieve insomnia and diminish irritability. Hospitalization is not advisable: if the parents can possibly be persuaded to put up with several months of misery the child will avoid the serious risk of succumbing to a ward infection, to which such infants are prone.

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ANÆSTHESIA AND ANALGESIA

By F. B. PARSONS, M.D., M.R.C.P.

SO far as the practice of anæsthesia is concerned, the past year has been devoted mainly to a consideration of the clinical applications of those agents and methods which have lately been placed before the anæsthetist and, in many respects, it may be regarded as a period of consolidation of knowledge. Cyclopropane, in particular, has been the subject of much investigation and, although several facts regarding this substance have probably still to be learned, there can be no question that it is a valuable addition to the range of gaseous anæsthetics. Reports concerning the use of vinyl ether suggest that it is peculiarly adapted for those administrations which, although of short duration, demand adequate muscular relaxation. The introduction of new anæsthetic agents, which has been a conspicuous feature of the past decade, has partially ceased; but a new short-acting derivative of barbituric acid, namely pentothal-sodium which, like sodium evipan, is administered by intravenous injection, is now available. Although, at various times, almost every possible anæsthetic agent has been recommended for the production of obstetrical analgesia, it is to be regretted that the problem of devising a method suitable for use by midwives in domiciliary practice in the absence of medical supervision is still apparently unsolved. It is the purpose of the following survey to review briefly the literature concerning both the above and other developments in anæsthesia made during the past year.

VOLATILE ANÆSTHETICS

Nitrous oxide.—The method of administering nitrous oxide and other volatile anæsthetic agents by means of a closed circuit incorporating carbon-dioxide absorption is obtaining increasing popularity because, apart from the employment of a minimal quantity of anæsthetic material, the resulting anæsthesia is easier to control and, in particular, respiration is quieter. Several different types of apparatus for this purpose have been described and divergent opinions still exist regarding the relative value of the single-phase system, in which the patient is connected to the apparatus by a single length of concertina tubing, which constitutes an appreciable dead space, and the two-phase system in which the dead space is limited to the face-piece. Harris[11] states that, in order to obtain the best results, the carbon-dioxide produced by each expiration must be completely absorbed, and he believes that a two-phase circuit renders easier the combination of correct physiological and mechanical principles. While some authorities prefer as simple an apparatus as possible, there can be little doubt that carbon-dioxide absorption is more efficient in the double-phase than in the single-phase system.

Minnitt's gas-air apparatus, which has proved so useful for the production of obstetrical analgesia, has been, together with other methods, the subject of investigation by the British College of Obstetricians and Gynæcologists[31] in an attempt to ascertain if there is any form of analgesia which can be used with safety and success by a midwife in the absence of a medical practitioner. In a series of over 3,000 cases this apparatus secured a satisfactory degree of analgesia in 77 per cent. and it is regarded as safe for use by midwives in hospital provided that a recent medical examination has revealed no contra-indication thereto. In view, however, of occasional restlessness and difficulty in controlling the patient it is considered essential that a responsible person should be present in addition to the midwife. In any circumstances, it is recommended that the use of this apparatus should be restricted to those midwives who have had special training in its use and it is believed that further experience will be necessary before the suitability of the apparatus for domiciliary practice is proved.

Chloroform.—The use of chloroform by midwives as an analgesic in labour has also been the subject of inquiry by the College of Obstetricians and Gynæcologists and it was found to produce effective analgesia when administered in a number of different ways. Chloroform capsules were found to produce satisfactory analgesia in 81·8 per cent. of cases, while Mennell's inhaler was effective in 84·9 per cent. and Christie Brown's inhaler in 78·8 per cent. There was no evidence either of damage to the child or of any appreciable delay in labour with chloroform, but it was believed that this agent was directly responsible for one death out of a total of 6 occurring in the series investigated. It is concluded with regret, however, that chloroform by any method should not be used by midwives acting alone, but it is stated that nothing in these conclusions should be taken to prejudice the administration of chloroform in midwifery by registered practitioners.

Ether.—The explosive nature of ether-air and ether-oxygen mixtures is a well-known disadvantage of this agent and adequate precautions are invariably taken to prevent ignition from naked flames and unprotected electrical apparatus. Attention has recently been drawn in this country to the risk of ignition of ether and certain other anæsthetic mixtures by static discharge on account of an explosion at a London hospital attributed to this cause.[13] It is believed that the risk of static discharge is increased by the construction of modern anæsthetic apparatus, by the practice of central heating in hospitals and operating theatres and also by the use of steamless sterilizers. As a result, the humidity of the atmosphere is at a very low level but, by increasing it, the risk of static discharge can be diminished. In order to ensure complete protection, however, the anæsthetic trolley, operating table, and other apparatus should be earthed; this can be accomplished by attaching to each unit a short metal chain of a sufficient length to touch the floor. In addition, earthing can be rendered more efficient by incorporating a metal grid in the granolithic floor of the theatre so that the trailing chain is always in control with some portion of this grid. Nevertheless, it is stated[21] that ethylene, commonly regarded as being especially liable to static explosions, can be used with perfect safety provided it is administered with the simplest possible apparatus, namely, a face-piece and rebreathing bag which, after the first 5 or 6 breaths, ensures a relative humidity of 100 per cent. and dispels the risk of explosion from static electricity.

Increasing attention is being directed to the method described by Gwathmey and McCormick[10] of instilling into the rectum an ether-oil mixture in order to obtain obstetrical analgesia. The mixture, which consists of ether 75 c.cm., quinine 1·3 gm., alcohol 3 c.cm., paraldehyde 8 c.cm. and liquid paraffin or olive oil to make 120 c.cm., is given either with a syringe or by gravity and it is administered when necessitated by the distress of the patient after the preliminary employment of 3 grains of nembutal followed by 1½ grains of nembutal with ⅙ or ¼ grain of morphine. Analgesia is effective for a period of from two to six hours and it is said that the instillation can be repeated at intervals of 2½ hours. The authors state that it is the safest of all satisfactory analgesias used up to date and that, in several series of many thousands of cases which have been reported, no maternal or infant mortality has been attributed to its use. The mixture can be prepared and kept indefinitely; there are no major physical contra-indications and the injection can safely be given to patients suffering from cardiac disease, tuberculosis and a number of other conditions. Labour is not prolonged and a satisfactory result is obtained in 85 to 95 per cent. of cases.

CYCLOPROPANE

Cyclopropane, the use of which as an anæsthetic was first suggested in 1929, is a heavy colourless gas possessing a sweetish odour. It has been the subject of considerable experimental work in the United States and is attracting increasing interest in this country. The gas is inflammable and it is important to remember that precautions similar to those taken with ether and ethylene should be employed in order to minimize the risk of explosion. Cyclopropane should be administered in a closed circuit with efficient carbon-dioxide absorption; the type of apparatus used is largely immaterial provided that flow-meters capable of measuring small quantities of both oxygen and cyclopropane are fitted. Rowbotham[23] states that complicated apparatus is unnecessary. Premedication with morphine reduces the amount of cyclopropane necessary to secure full anæsthesia by about 12 volumes per cent. and premedication with half the dose of the opium derivative usually employed, together with a full dose of hyoscine is advised.[24] Most of Rowbotham's patients received $\frac{1}{30}$ grain omnopon per stone of body weight and he states that, as a rule, this is insufficient to cause marked respiratory depression. The preliminary administration of avertin is recommended by Griffiths,[9] who has used this method in 371 cases and believes that the combination of avertin with cyclopropane represents the nearest approach yet made to ideal anæsthesia. Wood also advocates[29] the use of avertin as a premedicant to cyclopropane. After an experience of a large number of cases he finds a decrease in operative and post-operative morbidity when compared with other methods he has employed. He states that there is an unusually wide margin of safety and that a wide range of depth of anæsthesia can be secured without anoxæmia. In order to obtain satisfactory results it is necessary to exercise care in the selection of suitable patients and to employ adequate apparatus for the administration of both avertin and cyclopropane.

Two important points should be remembered by those unacquainted with the properties of cyclopropane when administering it as an anæsthetic.[28] First, although it is without irritant effect upon the respiratory tract, it has the potency of chloroform and ether. In consequence, a mixture containing a dangerously high proportion of cyclopropane can be inhaled without inducing a protective laryngeal spasm, and the percentage of gas, therefore, should not be increased at too rapid a rate. Nevertheless, it is stated[23] that laryngospasm may occur in the presence of high concentrations. The makers of cyclopropane recommend introducing the gas at the rate of 600 to 700 c.cm. per minute for a period extending up to 2 or 3 minutes and then waiting several minutes to permit distribution of the gas in the tissues and the development of the maximum narcotic effect. Rowbotham[23] recommends, after filling the rebreathing bag with oxygen, an initial rate of 250 c.cm. per minute, gradually increasing to 500 c.cm. per minute or more as necessary. In some quarters, however, it is considered desirable to introduce the gas at a still lower rate for a longer period of time. Secondly, cyclopropane is a respiratory depressant and the initial increase in rate and amplitude of respiration, which is characteristic of many other anæsthetics, does not occur. Cyclopropane, if administered as it should be, with excess of oxygen and without excess of carbon dioxide, may not cause any change in the minute volume or respiratory rate until depressive doses are reached. Indeed, the minute volume is believed always to be reduced.

Induction is pleasant for the patient and adequate anæsthesia is usually obtained in about 3 minutes. The blood pressure, both diastolic and systolic, commonly rises after induction, and it is stated[22] that the higher the concentration of cyclopropane in the blood, the higher is the blood pressure. Doubts have been expressed whether this is a direct effect of cyclopropane and it is suggested that an increased tissue gas-tension of carbon dioxide is, in the main, responsible.[25] If this is the case, it is desirable for the carbon dioxide absorber to be as efficient as possible. The degree of relaxation obtained depends largely upon the concentration of cyclopropane employed. Rowbotham never failed to obtain complete abdominal relaxation although it was sometimes necessary to increase respiratory exchange by artificial methods. Griffith states that he was able to secure adequate relaxation without the addition of ether in about 90 per cent. of cases.

Recovery from cyclopropane anæsthesia is rapid, and provided the concentration has been reduced during the final stages of the operation, awakening resembles that from nitrous oxide or ethylene. In certain circumstances, however, consciousness may not be regained for a considerable period. The incidence of post-anæsthetic complications does not seem to differ markedly from that of other gaseous anæsthetic agents, but the consensus of opinion is that nausea and vomiting occur more frequently than after nitrous oxide and less frequently than after ether. There is some evidence that the risk of post-operative respiratory complications is minimized when cyclopropane is employed, but it is now appreciated that the anæsthetic agent plays a less important part than many other factors in the causation of these conditions.

The suggestion has been made in many quarters that cyclopropane presents distinct advantages as an anæsthetic in thoracic surgery on account of the quiet respiration, the ample oxygen supply and the quick recovery of the cough reflex. These advantages, unfortunately, are offset by the explosive nature of the gas which prohibits the concurrent employment of cauterizing methods. Hewer,[12] however, considers that cyclopropane is particularly suitable as an anæsthetic in bad risk cardiac cases. A distinct disadvantage is the increased bleeding which occurs from the cut tissues; this is commonly thought to result in consequence of a raised blood-pressure and, if this belief is correct, recent opinion indicates that it can be lessened by increasing the efficiency of carbon-dioxide absorption. One authority[9] believes that excessive bleeding in these circumstances is largely illusive by reason of the heightened oxygenation of the blood. A further disadvantage is the occurrence of cardiac irregularities which, if disregarded, not improbably herald the onset of ventricular fibrillation.

In this connection, reference may be made to the work of Kurtz[17] who has shown that the occurrence of cardiac arrhythmias during anæsthesia which previously had been noted particularly in association with cyclopropane,[23, 28] are commoner than might have been supposed. Electrocardiographic investigation of 109 patients before, during and after anæsthesia with a number of agents including cyclopropane, ether, procaine, ethylene, nitrous oxide, vinyl ether, chloroform and avertin disclosed the presence of some type of disturbance in 79 per cent. of cases. The lowest incidence of arrhythmias occurred with procaine and the highest with chloroform; their onset seemed to be independent of the depth of anæsthesia or the steps in surgical procedure. The disturbances observed were of various types and they appeared more frequently in abnormal than in normal hearts.

There can be little doubt that cyclopropane is a valuable addition to the range of drugs available for the anæsthetist and that it can be used with confidence and safety by those instructed in its use. Some authorities, however, still regard cyclopropane as an experimental drug and believe that many facts regarding it are still to be learned.

VINYL ETHER

Vinyl ether, which is a colourless liquid with a boiling point of 83°F. and possesses a sweetish ethereal odour, is available mixed with a small proportion of alcohol and other stabilizing agents under the trade name of vinesthene. It can be administered either by the open drop method on to a gauze mask when the rate of administration should be in the region of 60 to 80 drops per minute or by the closed method preferably with carbon dioxide absorption. The former method is probably more useful for minor surgical procedures, whilst the latter is desirable for major operations. In either case, induction is rapid and consciousness is lost after a few inhalations; indeed, Goldschmidt[8] states that the usual time from the beginning of an administration to the production of relaxation of a sufficient degree for the performance of laparotomy is about three and a half minutes. When administered by the open method, the average amount necessary for the maintenance of anæsthesia is 2 c.cm. per minute.

Adequate muscular relaxation equal to that obtainable with ether can usually be secured with vinyl ether; there is, however, some evidence that complete relaxation is not always obtained. Marvin[20] has observed that when this agent is employed surgical anæsthesia can persist in association with a roving eyeball. During anæsthesia, a slight fall in blood pressure occurs in human subjects and excessive doses cause failure of respiration closely followed by cardiac failure.[5] As with cyclopropane, recovery is rapid, and if the anæsthetic is given slowly during the terminal stages of the operation, it is possible for the patient to be talking at the time of the introduction of the last skin suture. It is stated[20] that consciousness usually returns 5 to 10 minutes after the completion of a major operation and within 2 to 5 minutes after a minor operation. All writers upon vinyl ether appear to agree that the incidence of post-anæsthetic complications is at a very low level; in particular, the risk of post-operative pulmonary complications is minimized on account of the comparative lack of irritation of the respiratory tract. There is usually, however, increased salivation which can be prevented by adequate premedication with atropine.

Considerable attention has been directed towards the toxicity of vinyl ether, particularly in regard to liver function, but reports concerning the clinical use of this agent suggest that anxiety on this account can be discounted. Although the occurrence of a central lobular necrosis resembling but less marked than that following chloroform has been demonstrated experimentally,[8] Bourne and Raginsky[5] investigating dogs by means of the bromsulphthalein liver function test found that liver function is not appreciably altered by vinyl ether anæsthesia. When this test was applied to parturient women, it was found that, after vinyl ether, there was practically no liver damage whereas the results obtained after the administration of chloroform indicated definite impairment of the functions of this organ.[4] Careful experimental investigation upon mice by von Brandis,[27] however, leads him to conclude that the difference in the degree of toxicity between ethyl ether and vinyl ether is not appreciably marked. A distinction observed between ether and vinyl ether was that, although he found no late fatalities with ether, a number of animals, after recovering from anæsthesia with vinyl ether, died three or four days later. Von Brandis is unable to explain the cause of these late fatalities; post-mortem examination failed to reveal any conclusive evidence and, notwithstanding the negative findings, he suggests that liver damage may be responsible for these deaths.

Each anæsthetic agent has a special value for a particular purpose and Bourne recommends[3] the use of vinyl ether for the production of obstetrical anæsthesia in general practice on account of ease of administration, rapidity of action, the satisfactory maintenance of any desired degree of narcosis, the early uneventful recovery, and safety for mother and child. Like ether, this agent does not influence the contractile power of the uterus, but unlike ether, it does not inhibit the automatic movements of the intestine. Although in these circumstances, vinyl ether can be given with relative safety by the open drop method, it is administered preferably in a closed apparatus with oxygen; this not only precludes asphyxia and waste of material but affords the means of mixing vinyl ether vapour with any other anæsthetic gas. In addition, it prevents the deleterious effect of anoxæmia upon liver function. Bourne has had an experience of 652 administrations of vinyl ether in obstetrical cases of all kinds and conditions with one fatality in a subject of eclampsia whose death was not attributable to the anæsthetic.

Goldman[7] has recently reported his experiences with a series of 364 administrations in patients whose ages ranged from 7 weeks to 50 years for a variety of minor, mainly dental, operations. Cyanosis was not observed and no patient vomited or complained of nausea; the recovery period was very short indeed. The drug was administered by the closed method in a modification of Ormsby's ether inhaler and, in view of the fact that vinyl ether readily decomposes after a bottle has been opened for some hours, Goldman advocates the use of 3 c.cm. ampoules. He concludes that this substance can be used as an anæsthetic for short cases in an unprepared patient without premedication.

A consideration of the essential features of vinyl ether anæsthesia indicates that its clinical usefulness lies mainly in the field of minor surgery where the operative time is short; the ease with which it can be administered by the open-drop method and the short recovery period renders this drug particularly suitable for use in ambulatory patients.[20]

SPINAL ANALGESIA

The peculiar requirements of thoracic surgery have led to the description of a diversity of methods suitable for this purpose, and Magill has investigated[19] the effect of spinal analgesia in 23 operations for lobectomy and pneumonectomy. After premedication with 1/3 grain omnopon, 1/150 grain scopolamine and sufficient nembutal given intravenously to secure quiescence, percaine 1 in 1,500 was employed as the analgesic agent. In a few cases analgesia was incomplete at the upper limit of the incision and supplementary local injection was necessary. The patient was usually able to breathe quite well and it was rarely necessary to administer oxygen; the cough reflex remained active and sputum was voided with reasonable ease. Particular attention was directed to the position of the patient both during and after operation. Magill states that spinal analgesia appears to be a practical and safe procedure for lower thoracoplasty and lobectomy. The efficiency of the method seems to be dependent upon the well-known fact that, in spinal analgesia, the sensory roots are affected by the drug injected more readily than the motor roots and, in consequence, an adequate degree of analgesia can be obtained with safety.

AVERTIN AND THE BARBITURATES

Avertin continues to be regarded as a safe and reliable basal narcotic, particularly for children, and a personal experience of its use for eight years supports this view. During the past year Sir Francis Shipway[26] has drawn upon his extensive experience with this drug and has analysed the results of 1,600 administrations. He states that, when given in accordance with established principles, avertin can be used with complete safety. He believes that the dosage of avertin should be individual; for example, obese, cachectic, anæmic, and toxic patients with low blood-pressure require a relatively smaller dose than normal, while highly imaginative people who live at a higher rate of nervous tension require a larger dose than normal. In the series under consideration, no patient died from a pulmonary complication notwithstanding the fact that no patient was refused avertin because of bronchial or pulmonary infection, and Sir Francis is of the opinion that avertin reduces post-operative morbidity and mortality. He stresses the fact that drugs which depress respiration should not be given before avertin until the anæsthetist has gained full confidence of its action and he believes that liver and kidney disease are not contra-indications to its use but call for reasoned dosage.

The use of an unusually large dose of avertin as a basal narcotic in a woman weighing almost 25 stones has been reported by Ashworth[1]. In this instance a dose of 0·09 gm. per kgm. of body weight was given and the patient received 14 gm. of the drug. Ether was used as an additional anæsthetic and there was an uneventful recovery from the operation of cholecystectomy. Scientific corroboration of the value of coramine and ephedrine, in order to interrupt avertin narcosis has been furnished by Barlow[2] who is also impressed by the use of metrazol in this connection. A recent development which greatly simplifies the preparation of avertin solution is the use of tap water instead of distilled water for this purpose. Some samples of tap water, however, are probably unsuitable and if the solution is prepared in this manner it is desirable that it should be tested before use with congo red or some similar indicator with more than usual care.

Nembutal.—On account of the uncertain effect produced when nembutal is administered by the mouth to children, Jarman[14] suggests that this drug should be given by the rectum in the form of suppositories at least three hours before the operation. The dosage advocated is one grain for each year of age, with a maximum of six grains, for children between one and eight years. Nembutal can be given orally to older children. He states, that although it is still too early to decide upon the exact dosage and time for this new method of using nembutal, it has been used with success in nearly 200 cases and is well worth a trial.

Sodium evipan.—This rapidly acting derivative of barbituric acid which is administered by intravenous injection has become firmly established as a useful addition to the range of drugs available for the anæsthetist. It is most commonly employed in order to secure deep anæsthesia which, although persisting only for a short period, can be extended if desired, by the subsequent administration of a volatile inhalation anæsthetic. Prolongation of anæsthesia by repeated injections of sodium evipan is also practised and this method has been advocated for use in thoracic surgery[6]. In these circumstances injection is facilitated by previously fixing the arm in Wright's arm splint[30] and by introducing the drug into the vein in a continuous intravenous infusion. This can be accomplished either by injecting the solution of sodium evipan directly into the rubber tube connecting a flask of glucose-saline solution to the intravenous needle or by the use of a special three-way syringe.[15]

Pentothal-sodium.—This substance, which chemically is sodium-ethyl-*l*-methyl-butyl-thiobarbituric acid and falls into the group of short-acting barbiturates, has been introduced to this country during the past year. It is a white powder which is usually administered in the form of a 10 per cent. solution intravenously in the same manner as sodium evipan. Lundy, who reports over 1,400 administrations[18], states that pentothal-sodium is approximately 33 to 50 per cent. stronger than sodium evipan, so that the dose of the former is approximately two-thirds to one-half that of the latter. He recommends introducing the drug in the form of a 5 per cent. solution; if no more than 0·2 gm. is given, the patient will recover quickly, and to maintain anæsthesia the solution is injected in intermittent doses of 0·5 c.cm. to 1·0 c.cm. until 1 gm. has been given. The rapidity with which consciousness is regained is directly proportional to the amount administered and after a dose of 0·6 gm. the average adult usually regains consciousness within ten or twelve minutes. In a series of over 1,000 cases, Jarman and Abel[16] state that there has been no death following the use of pentothal-sodium neither does any pathological process appear to have been aggravated. No patient who had pentothal alone vomited after an operation. The distinction between pentothal and evipan is summarized by Jarman as follows:—(1) Induction with pentothal is a little smoother and pentothal scarcely ever produces the twitching which has occasionally been seen with evipan. Lundy has, however, apparently noted the occurrence of twitching with pentothal. (2) The fall in blood pressure is less noticeable than with evipan. (3) Pentothal is more depressing to the respiratory centre and therefore it is important to have at hand an apparatus capable of administering oxygen and carbon dioxide under pressure.

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GENERAL PRACTICE

NO. IV—MEDICAL ETHICS

BY C. O. HAWTHORNE, M.D., D.Sc., F.R.C.P.

THAT the practice of medicine sometimes creates personal situations which are special and particular seems evident from the fact that many chapters and even entire volumes have been devoted to the subject, while, equally significant, is the issue by various professional organizations of directions or regulations guiding or advising the conduct of the practitioner in given or selected circumstances. A popular interpretation of these announcements is that the medical profession is bound by an elaborate series of rules, framed in the interests of the profession, capable of being enforced by penalties, and included under the term medical etiquette. Here it is sufficient to remark that no such bonds exist except in so far as they harmonize with or directly support the public interest. Without this sanction rules in the profession of medicine, as in other professions, are without justification and incapable of defence. And this in the particular instance means that the welfare of the individual patient is the supreme and predominating claim. Subject to this proposition, and not inconsistent with it, is the consideration that medicine is a profession and not a business enterprise, and that those who practise it are not mere rivals for popular favour or for commercial success. On the contrary, they, and they alone, are conscious of the special difficulties which attend their calling; they are aware of the ease with which professional actions may at times be misrepresented or misunderstood; and hence they owe to one another a special measure of mutual respect, support and regard. As a form of social service medicine must put in the first place the interests of the community, but this end will not be promoted by the cultivation of undignified competition or enterprising self-advertisement; indeed, the greater aim is promoted, not hindered, by the recognition of individual duties, rights and mutual responsibilities. It is in order to adjust these two positions, the general interest and the individual claim, that there exists a code of directions or advice, to a large extent unwritten, that may be spoken of as a body of medical ethics. The principles on which these rest have long been recognized and have traditional value, and although their application is perhaps not always easy and may in some degree be governed by circumstances, they have a sure foundation. Essentially they mean first of all the welfare of the sick man, and secondly, the practice of the golden rule in all intra-professional relations. When these claims are met, and in the order here presented, the demands of medical ethics have received a full recognition.

ADVERTISEMENT

As opposed to the position just stated the suggestion is sometimes advanced that it is unreasonable that doctors should abstain from open advertisement. The doctor, it is urged, has something to offer to the public, why then should he not announce his abilities and opportunities to the general attention? Here, quite decidedly, is an answer on the word of authority, and disobedience may have serious consequences. The General Medical Council may exercise its penal powers against any practitioner who by the methods here in question endeavours to attract patients to himself or to gain some other form of professional advantage, and some of the diploma-granting bodies practise a similar discipline. It is not, however, merely by technical authority that self-advertisement is condemned. The ultimate judgment rests on the general opinion of the profession. The practice, it is recognized, would compromise the dignity of the profession, and once permitted might well lead to unseemly competition; further, practitioners of medicine are conscious not so much of their achievements and possibilities as of their limitations; and members of the public cannot be expected to judge of the exact significance of medical titles and qualifications. In these circumstances anything like public proclamations and claims are felt to have an unseemly quality, and the general opinion of the profession is decidedly adverse to them.

Although open and undisguised advertisement is thus firmly ruled out, difficulties sometimes arise in connection with what has been called "indirect advertisement," as illustrated, for example, by the contributing of articles to the newspapers, letters to the editor, and the delivery of public lectures; and there are people who suggest that professional restriction in these directions is enforced in order to prevent the extension to the public of a useful knowledge of health and disease. Such a suspicion is absurd, yet there are minds in which it exists. Medicine, as its disciples know, has no "secrets" open only to the initiated; its practice is common sense informed by technical knowledge and practical experience. It is not an ignorant but an educated public that will contribute to the effective application of medical practice both to the benefit of the community and to the welfare of the individual patient. As a fact, there is no restriction on the action of the medical practitioner in the directions here considered. The doctor, like his neighbours, is a free citizen in a free country, and if he desires to take part in public affairs and discussions by contributions to the newspaper press or otherwise there is no one to say him nay. Indeed, there are occasions when because of his knowledge and experience and because of the influence which he can command it may well be his duty to make his advice and opinion known, and this not merely on non-medical questions but even on professional issues.

There are, however, ways and fashions. An appearance on the newspaper scene with the puff preliminary in the shape of a laudatory editorial preface, a display of a wealth of professional titles and decorations, an inserted more or less engaging personal photograph, and an announced professional address form a combination of circumstances which are calculated to raise a doubt whether the motive of the writer is a pure and simple desire to inform and direct the public interest, or whether, on the other hand, he cultivates an ambition to impress upon the reader the importance of his own professional status and accomplishments. Even in newspaper or other discussions the medical contributor will find that a measure of dignity and reserve is appreciated by his colleagues.

Another aspect of this question of advertisement is presented by the "social column." Admittedly in certain newspapers an announcement of personal movements and other activities can be secured for a more or less considerable fee, and now and again the names of doctors appear in these select companies. Obviously, in principle, there can be no difference between a paid paragraph in a social column and a paid paragraph in the advertisement column, and if the one falls below the professional level so also does the other. Yet censure must not be too ready. The press has its own rules and enterprises, and if the editorial judgment thinks certain names and activities of interest to the reading public it will not be hindered by any desires or views of the medical profession. Since the days of Mr. Vincent Crummles it has been a source of wonder how "these things" get into the newspapers, and fame as proclaimed by the reporter carries its penalties. Hence it does not always follow that the doctor quoted or named in the newspapers is necessarily an accessory before the fact. He may indeed, be an unwilling and more or less reluctant victim. In various volumes displaying personal and professional details and having a certain social vogue the appearance in the parade of doctors and their achievements seems to be sanctioned by custom, although a consistent defence for the practice would be difficult to define.

MEDICAL CONFIDENCES

The public interest in the sanctity of medical confidences is an obvious proposition. In the very nature of things frankness on the part of the patient and silence on the part of the doctor are essential conditions of medical practice. Clearly it would be a most dishonourable action for a doctor to reveal what he learns of a patient or of a patient's affairs in the secrecy of a professional interview, and a talkative doctor, if one can be imagined, would be a social nuisance and mischief maker. Yet there are occasions on which the negative attitude and the refusal to give information are misunderstood. Hence, it is important to recognize that in the last analysis the professional practice is governed by concern for the public interest; for obviously were the confidences of the consulting room and of the sick chamber not respected, sick folk would hesitate to appeal to doctors or to be frank in their communications, with the result that the early and curable stages of various illnesses would be neglected and in certain diseases the spread of infection would be facilitated. In other words, it is a public interest, not a mere professional rule, that patients should be assured that doctors are silent about their patient's affairs.

To this rule and custom the law decrees certain exceptions. Doctors, for example, are compelled to give professional particulars in certificates of the cause of death, in notification of certain infections and industrial diseases, and, in given circumstances, of the fact of birth. What the law claims must of course be yielded. The position, however, is less decided when the doctor is in the witness-box. A strict construction is that the court has no concern with the claim of professional confidences and secrecy. The lawyer, for obvious reasons, enjoys " privilege," that is he cannot be questioned on communications that have passed between himself and his client. But no such " privilege " is allowed to the medical witness though the claim for it is obviously for the advantage not of the doctor but of the patient. The doctor may protest or may claim the protection of the court, but the final word rests not with him but with the judge, and what that word will be may vary with the personality of the judge. The older practice was unbending, but in recent years there have been occasions on which the request or protest of the witness has been effective. If it is not effective the witness has only a narrow choice—he must either answer or take the risk of being sent to prison for contempt of court. It is of interest to note that in theory the secrets of the confessional, equally with those of the consulting room, are not regarded by the law. But in practice they are secure, because the courts know that a priest will in no circumstances deliver the confession of his penitent; rather will he go to prison. Possibly the medical witness may enjoy a similar immunity when he determines to practise a similar heroism.

Attempts are sometimes made to invade the obligation to professional secrecy by suggestions that the practitioner should volunteer or provide information relative to his patient in answer to requests made by interested persons, such as actual or prospective employers, relatives, friends or a contemplated bride or bridegroom. Even solicitors and insurance companies sometimes practise this procedure and perhaps regard the telephone as a suitable medium of communication. Without the consent of the patient, and preferably the written consent, all such invitations should be firmly declined. It is easy in some of these conditions to work up a sentimental plea that by speaking a doctor may protect some person from, say for the sake of example, an unfortunate marriage. The defence of silence, however, remains secure. As already argued, the betrayal of medical confidences is contrary to public policy; once relax this principle and there is no logical halting place for refusal. The practitioner, by answering questions relative to his patient, may expose himself to an action for damages; and if in any circumstances a medical certificate is required, as well may be the case in reference to, say, employment, marriage, insurance and the rest, the patient or proposer may be required to produce it by those who desire such information. In these circumstances consent is implied, and the ethical position is entirely different from that created by questions addressed to the doctor, or information volunteered by him, without the knowledge and approval of his patient. Even the well-intentioned and sympathetic inquiries of friends and neighbours must be treated with discretion, and it is well for a doctor to be gruff rather than garrulous. It used to be told of Disraeli that, when greeted by a colleague whom he could not at the moment identify, he was accustomed as promptly as possible to put confidentially to his interviewer the question, " And how is the old complaint?" The topic of the individual grievance has obviously the prospect of competing successfully with other subjects which might prove embarrassing. Tact has its value, but in any event the rule of silence should not be qualified. Sometimes an extreme case has been posed as an exception, for example, evidence of communicable venereal disease in a nursemaid in charge of young children. Probably if the patient refused immediate resignation and if the practitioner could justify his diagnosis a breach of the strict rule would generally be regarded as justified, as no alternative method of protecting innocent persons from disaster would seem to be available. Such a possibility may be used to emphasize the necessity for every practitioner to be a member of one or other of the medical defence organizations, where he can, on the payment of a small annual fee, both obtain experienced advice in difficult situations and be provided with legal defence should an action for damages relative to any of his professional activities be entered against him.

Inquiries in reference to patients or to experiences in practice are sometimes addressed to doctors by the police, who, speaking generally, are far from appreciating the public value of professional confidences. Such inquiries should be treated with much reserve and should be dealt with under the general principle that although doctors will certainly not take any share in the concealment of manifest crime it is no duty of the medical practitioner to investigate the value of suspicious facts, or to repeat hearsay statements, or to act as agents of the detective police.

THE PRACTITIONER AND HIS COLLEAGUES

In the relations of the practitioner to his fellows, while certain established customs and even rules are written and must be written, the principal influence to be cultivated is that of good fellowship. Most men know what is meant by " cricket " and the spirit of the game. Difficulties and differences will arise but most of them can be successfully met by mutual goodwill and recognition of the other fellow's point of view. In this respect there is much virtue in the personal interview and in the frank, courteous and open statement of grievances and of explanations; confession of error, when it occurs, goes far to redeem the mistake. Correspondence, though not always avoidable, is apt to sharpen the temper as well as the pen. Still, when all is said and done, there will sometimes be opposing claims and even opposing accusations. Reference to a judge or mediator may thus be necessary. If no senior practitioner can be jointly accepted as an arbitrator, a competent court is available in the shape of some medical organization, such as the corresponding division of the British Medical Association or one or other of the medical defence organizations already named. To bring these intra-professional differences to the surface and to close the issue is much to be preferred to the maintenance of an atmosphere of mutual bitterness and distrust. Personal disputes between colleagues do not increase the status and dignity of the profession in the judgment of the community.

THE SECOND OPINION

One source of these disputes is the position which arises when a patient desires a second or further opinion on his case. Whether that desire seems to the doctor reasonable or unreasonable it certainly deserves respect, and opposition to it can rarely be justified. The practitioner is entitled to his view and to an expression of his view, and he may well advise the source from which co-operation should be sought; but on each of these questions the patient is entitled to the last word. It is quite a reasonable contention that it is in the patient's interest that the doctor thus selected shall have from the attending practitioner a medical record of the illness. But this is not always the patient's view. On the contrary, he may desire what he regards as an "independent" opinion. And to this, if he so wishes, he has a full right. He will sometimes exercise this right without the knowledge of his attending medical adviser, and in so doing he certainly fails in courtesy and even generally in wisdom. But, after all, a patient is not the property of any individual doctor and in a free country he has a right to request advice from any source which he believes, either on good or on bad grounds, likely to be helpful. And, be it allowed, when a man is concerned about his health he may, at least in some measure, be excused if he is a little careless of the social graces and of rules which he probably regards as of purely professional creation. To prevent misunderstandings in this respect it has sometimes been argued that the medical profession ought to be grouped into consultants and general practitioners, and that the former should see patients only in consultation or agreement with the personal or family doctor, on the analogy of the division of the legal profession into barristers and solicitors. No such regulation is possible even were it desirable. Strictly interpreted it would mean that the man in general practice should never act as a consultant, for, of course, restrictions cannot logically or even fairly be unilateral: and this is manifestly absurd. Everywhere indeed there are doctors engaged in family practice who on account of seniority, experience and repute are looked to by their colleagues for clinical co-operation when circumstances call for a considered judgment, and this to the advantage both of patients and of the profession; in short, every practitioner may on occasion act as a "consultant." Equally the public demands the right to a direct approach to any medical adviser whose opinion the patient desires to obtain. There is freedom for the patient to request an opinion and freedom for the practitioner to give an opinion, and no attempt to restrict either of these freedoms will prevail in opposition to custom and the weight of public opinion.

There is, however, together with this freedom room for the practice of intra-professional courtesy. As already stated the best course in the patient's interest when two doctors are concerned is that the two should act in co-operation. When the patient has failed to act on this principle professional seemliness demands that the second doctor shall communicate with the attending practitioner, and should the patient refuse to allow this proposal then the "consultant" should decline to accept him as a patient. This is to affirm two principles—one that the proposal is in the patient's interest, and the other that courtesy and regard are due to a medical adviser even although the patient deems it desirable to check or supplement his advice by a further opinion. In short, here as in so many other human relationships, frankness and loyalty and open dealing contribute both to effective administration and to mutual confidence and goodwill. A patient is perfectly at liberty to change his medical adviser at any time and for any reasons, good, bad, or indifferent. But the change ought to be effected in a seemly fashion. If the change is made during the course of an illness the new adviser is obviously ill-equipped for his responsibilities without information which is in possession of the earlier attendant, and if continued co-operation between the doctors concerned is not desired then the decision ought to be courteously conveyed to the original attendant, with a corresponding relief from personal responsibility. In any event, professional differences of opinion do not lessen the claim for mutual loyalty, and although sometimes used as a popular taunt such differences do not mean that doctors are more stupid than their neighbours but rather that the problems presented to them are peculiarly difficult.

CONCLUSION

That some knowledge of the subjects covered by the term medical ethics should be cultivated by every member of the medical profession is obvious, especially in view of the increasing points of contact between medicine and the health and other interests of the community. At the same time it is not unpleasing to reflect that many practitioners, perhaps the majority, have without any acute consciousness of written rules practised their profession for many years with the unfailing regard and goodwill of their colleagues and neighbours. They have cultivated medical ethics by instinct and good nature rather than by rule and authority, just as M. Jourdain spoke "prose" all his life without being aware of his achievement.

PRACTICAL NOTES

INSULIN FOR SCHIZOPHRENIA

The use of insulin to produce deliberately the manifestations of hypoglycæmic shock as a means of beneficially influencing schizophrenia is described by I. G. H. Wilson in a special report issued by the Board of Control (H.M. Stationery Office, Price 1*s.* 3*d.*). Visits have been paid to the principal clinics abroad where this treatment has been employed and the results reported indicate that whatever may be the cause of the effects obtained there is in many cases a degree of clinical improvement which is described as " very striking. " The insulin is injected intramuscularly, beginning with 15 to 30 units for a fasting patient and increased by 5 to 10 units daily until a dose is reached to which the patient reacts with what is known as insulin " shock. " Following this the shock dose is given daily with the omission of one day per week so long as active treatment is desired. This phase may last for anything from a few days to three months, the average duration being four to six weeks. Following this a phase of stabilization is instituted in which the patient either receives a dose of insulin short of the shock dose or the hypoglycæmia is interrupted before the full effects of the dose have been produced. Full details of the methods used for terminating the insulin shock and for the treatment of complications are given in the report which concludes with a plan for a complete trial of the method in this country.

DIET IN CHRONIC NEPHRITIS

When progressive renal failure is present the dietetic rules are quite clear according to R. Platt (*British Medical Journal*, August 29, 1936, i, 437). The protein intake must be restricted to the minimum necessary for the replacement of tissue breakdown; fluids may be administered liberally; and rigid restriction of salt intake is neither necessary or desirable. The following menu is suggested as fulfilling these principles :—

Breakfast.—Weak coffee or tea with milk. Porridge or cereals with milk. Bread or toast and butter. Marmalade. Half an orange or grape-fruit.

Mid-morning.—Biscuits.

Lunch.—Potatoes and vegetables (*not* peas or beans). Yorkshire pudding. Milk pudding or custard. 5 oz. fruit.

Tea.—Tea with milk. Bread, butter, cake, jam. 8 oz. salad.

Supper.—5 oz. fruit. Bread-and-butter (or biscuits).

No meat extracts. Sugar as desired. Fluids such as water, soda-water, lemonade, ad lib.

Add to the above diet 2 oz. meat, fish, chicken, game, ham, or cheese, at one meal only each day.

In severe cases the protein additions are excluded for the first few weeks or given only for three days each week. It is unwise for chronic renal patients to take more than a minimal amount of fat.

CAMPHOR AS HEART STIMULANT

The use of camphor as a circulatory stimulant is widespread, although recent laboratory work has suggested that it may in fact be a cardiac depressant. A valuable re-investigation of the whole subject by R. N. Chopra, J. S. Chowhan and N. De (*The Indian Journal of Medical Research*, July, 1936, xxiv, 249) confirms the experimental findings that natural camphor and certain synthetic products are definitely depressant upon the heart and circulation in experimental animals. If, however, weak concentrations of camphor are kept in contact with the heart or other living tissue for a certain length of time and then used for injection, a slight but definite stimulant effect is obtained. It is suggested that when camphor comes in contact with a living tissue certain slow biochemical changes take place so that the clinical effect of cardiac stimulation is observed. It is probably that the chemical change occurs in the liver. As a practical point olive oil was found to be the best solvent for the camphor in the experimental work.

A NEW DRUG IN THE TREATMENT OF MORPHINISM

The search for a suitable sedative for calming the restlessness of drug addicts when their morphine or other substance taken as a habit is being withdrawn has resulted in the discovery of rossium (diphenyl-methyl pyrazonyl). According to A. Lambert (*New England Journal of Medicine*, July 9, 1936, ccxv, 72) rossium reduces the withdrawal symptoms and the time necessary for hospitalization in patients under treatment for addiction to opium alkaloids or chronic alcoholism more effectively than any other drug so far tested. The dose given is 0·05 gm. per pound of body weight in the twenty-four hours. Thus a patient weighing 120 lb. receives 6 gm. in the form of two 0·5 gm. capsules every four hours. During the first forty-eight hours this is accompanied by a sufficient dose of morphine to make the patient comfortable. After this period the latter drug is stopped and the rossium continued. Sweating is a marked effect of the drug together with the sensation of a mild coryza and slight nausea. Further details of treatment, including the judicious use of codeine and hyoscine, have to be adopted to the needs of the individual patient. Experimental evidence suggests that rossium may act in preventing the development of anaphylactic manifestations.

TREATMENT BY PARAFFIN WAX

According to S. Delaplace (*Le Progrès médical*, August 8, 1936, 1284) the use of paraffin wax for the treatment of many disorders is not yet sufficiently widely known. The wax should be sprayed on to the skin at a temperature of about 80° C. (no real sense of burning being experienced). As it solidifies it retracts and it is claimed that it is this uniform pressure which prevents burning effects. Under the paraffin covering sweating takes place and this is reputed to be an important part of the treatment. It is recommended for its sedative heating properties in certain neuralgias, sciatica, stiff neck, lumbago and possibly also over the site of pain in inflammation of internal organs such as cholecystitis. The method has also been employed in the treatment of arthritis and it is recommended for phlebitis, certain resistant skin disorders (acne, eczema, pruritus). It is also suggested that in obesity general paraffin wax baths may be of value because of the large amount of perspiration passed out of the body in this way.

INTRASPINAL INJECTIONS IN CHRONIC ARTHRITIS

G. Boschi (*Il Policlinico*, July 20, 1936, 1315) draws attention to this method of treatment. It is an old idea that arthritis deformans is an expression of a pathological change in the sympathetic system, in some way also related to disorders of the endocrine glands. There is therefore a logical basis in attempting the treatment of chronic endogenous arthritis by the use of a disintoxicating agent on the nervous centres. Phenolsulphophthalein is injected intravenously or intramuscularly as used in the diagnosis of renal function. From 3 to 7 mgm. in 1 c.cm. of doubly-distilled water, slightly alkalinized, are used intraspinally after the extraction of a few c.cm. of cerebrospinal fluid and repeated at intervals of two to three weeks. Eight cases are reported in which there was apparently considerable benefit

BLOOD TRANSFUSION IN TYPHOID FEVER

A claim that blood transfusion will almost halve the fatality rate in typhoid fever is made by P. T. Lantin and F. S. Guerrero (*The American Journal of the Medical Sciences*, June, 1936, cxci, 850) who have treated forty-one severe cases in this way and compared the results with thirty-four controls. The series included only unmistakable cases of typhoid fever verified by blood culture and the controls were also positive in blood culture and were given regular symptomatic treatment only. The procedure is to remove 150 c.cm. of blood from the patient and this is immediately replaced by direct transfusion of 200 c.cm. of blood from a donor. If no favourable reactions are observed, or if marked toxæmia returns, the blood exchange is repeated on the following day or as often and as many times as required by the severity of the infection, after an interval of two to four days. If intestinal hæmorrhage had occurred, the preliminary removal of blood is omitted and the transfusion given at once. The fatality rate was reduced from 47 per cent. to just over 24 per cent. in the patients treated by blood transfusion as compared with the controls.

GLUCOSE PER RECTUM

The rectal administration of glucose is a popular measure and its usefulness is seldom queried. A. B. Corkill (*The Medical Journal of Australia*, June 13, 1936, i, 807) has, however, conducted a series of experiments which throw grave doubt upon whether absorption of this substance from the rectum does in fact take place. Animal experiments showed that following the injection of glucose into the rectum, the blood returning from this portion of the bowel failed to yield any evidence suggestive of even a slow rate of absorption. On the other hand, glucose injected into the small intestine was rapidly absorbed. Some experiments were also conducted in man and it was shown that glucose administered even at the rate of 30 gm. per hour by a continuous drip apparatus failed to cause any rise in the systemic blood glucose. Even when large amounts were allowed to remain in the bowel for a considerable period no rise in the blood glucose was observed. Another series of experiments in man were based on the relief of ketosis. A starving patient with a mild degree of ketosis had this latter disturbance completely cut short by the oral administration of 10 gm. of glucose during the starvation period, but, on the other hand, 30 gm. of glucose per rectum failed to affect the ketosis at all. It is concluded that absorption of glucose from the human rectum is of no therapeutic value.

ACETARSONE FOR VINCENT'S ANGINA

The use of arsenical preparations in the treatment of infection of the gums and fauces by Vincent's organisms has been successfully used in recent years, but there is still some doubt as to the best preparation to use. According to C. H. Maxwell (*New York State Journal of Medicine*, June 1, 1936, xxxvi, 874), who has investigated various local applications alone or combined with internal medication, the most rapid cure is obtained by the use of acetarsone (also known as acetarsol). He employes a thick paste made of this drug which is massaged into the gums. A tablet of 0·25 gm. can be triturated with a few c.cm. of water or, better, glycerine for this purpose. Acetarsone is also given by the mouth in tablets of the same dose three or four times a day for an adult or half this quantity for a child. It is stated that so efficient was this method that most of the patients could eat without difficulty within twenty-four hours, and no other form of treatment produced any improvement on these results.

A TEST FOR INTESTINAL TUBERCULOSIS

The occurrence of diarrhœa in patients with pulmonary tuberculosis raises a difficult diagnostic point as to whether there is actual tuberculous disease of the intestines or not. The finding of tubercle bacilli in the fæces does not necessarily mean bowel disease. Triboullet's test has been used for some time in France and to a slight degree in this country and its value has been recently confirmed by Stein and Dierichs (*Münchener medizinische Wochenschrift*, August 7, 1936, lxxxiii, 1302). The test depends essentially upon the presence of albumin in excess in the stools. It is advisable to give a diet free from albumin for three days and then a small portion of fæces is shaken up with distilled water, filtered, and 3 c.cm. of the filtrate should be placed in two test tubes with 15 c.cm. of distilled water. To one tube 20 drops of Triboullet's re-agent is added, the other serving as a control (the reagent consists of 3·5 per cent. corrosive sublimate and 1 per cent. acetic acid in distilled water). The tubes are examined after five and fifteen hours. A positive result is shown by a more or less voluminous brown precipitate in the tube to which the re-agent was added without any alteration in the control tube. The German authors report a high percentage of positive results in cases subsequently proved to have tuberculosis of the bowel.

REVIEWS OF BOOKS

Recent Advances in Genito-Urinary Surgery. By Hamilton Bailey, F.R.C.S., and Norman M. Matheson, F.R.C.S. London: J. & A. Churchill, 1936. Pp. viii and 213. Figures in the text 89. Price 15*s.*

It has long been evident that there was a place in the well-known " Recent Advances " series for a volume on surgical urology, and the present work admirably fills the gap. In a subject such as this, in which advances are being made very rapidly, it must have been difficult to keep the material up to date, but the authors have succeeded in giving a concise account of all the more important recent developments in genito-urinary surgery. That it had to be concise is in some respects a disadvantage, but the aim has evidently been to include points of practical value and reduce the space given to theoretical and even pathological considerations; this is exemplified particularly in the chapter on renal tumours. While the descriptions given are sometimes inadequate for the purpose of the surgeon who desires to apply them, they are sufficient to indicate the possible lines of action, and reference to the bibliography will enable those who require more detail to find it. Full use is made of illustrations in the text, but their reduced size often detracts seriously from their value. There are a few omissions; no mention is made of von Lichtenberg in the chapter on hydronephrosis, nor of Edmunds's operation in hypospadias. One might also have expected something about transurethral resection in retention of urine in women, but these examples only serve to show what a high standard has been achieved in the remainder of the book. It can confidently be predicted that this latest member will worthily uphold the traditions of the " Recent

Reports on Chronic Rheumatic Diseases. The Second Annual Report of the British Committee, appointed by the Royal College of Physicians, London. Edited by C. W. Buckley, M.D., F.R.C.P. London: H. K. Lewis & Co., 1936. Pp. ix and 140. Price 10*s.* 6*d.*

Most of the articles in the second volume of these well-edited Reports deal with the important aspect of etiology. In the opening article by Professor L. S. P. Davidson and Dr. W. Goldie of Aberdeen on chronic infective arthritis, a term they prefer to that of rheumatoid arthritis, it is argued that cases resembling those of proved infective origin, but lacking evidence of an infective focus, should not therefore be classed as non-infective. The authors draw an analogy between the treatment of chronic infective arthritis and that of tuberculosis, and insist on the importance of early treatment in both. In a review on rest and chrysotherapy in the treatment of chronic arthritis the editor expands this analogy. Dr. W. S. C. Copeman argues that a number of cases of rheumatoid arthritis are due to a low-grade tuberculous infection, and Dr. G. J. Griffiths describes his research on the etiological relation of the *Streptococcus hæmolyticus* to rheumatoid arthritis, based on serological examination of 137 cases in the Devonshire Royal Hospital, Buxton. Professor E. C. Dodds contributes a note on research into the biochemistry of joints, and this is followed by Dr. Bywater's report on his experimental investigation on the metabolism of joint tissues. Mr. Race supplies a critical review of recent laboratory work in rheumatic diseases and Dr. P. S. Hench of the Mayo Clinic supplies a welcome review of work in America. Mr. Timbrell Fisher writes on the prevention and treatment of deformity in rheumatoid arthritis, and Dr. P. Ellman and S. D. Mitchell bring forward interesting observations on the psychological aspects of chronic rheumatic joint disease.

Manual of Public Health : Laboratory Practice. By J. R. CURRIE and contributors. Edinburgh : E. & S. Livingstone, 1936. Pp. xix and 378. Figures in the text 169. Price 21*s*.

THIS book is intended for the use of medical men studying for or actually practising public health work. The main sections are on chemistry, bacteriology, protozoology (by Dr. A. G. Mearns), helminthology (by Miss Margaret W. Jepps), entomology (by Dr. Robert A. Staig) and meteorology. The whole is well-planned, profusely illustrated and essentially practical without too much elaboration of highly technical points—as in the section of chemistry where it is pointed out that the medical officer of health is not destined to perform the duties of a public analyst. The section on meteorology—unusual in a work of this character—is a valuable summary of an important subject and the last paragraph of the book on " forecasting " suggests that in future the medical officer of health must be prepared to supplement the nightly " weather forecast."

Exophthalmic Goiter and its Medical Treatment. By ISRAEL BRAM, M.D. Second Edition. London : Henry Kimpton, 1936. Pp. 456. Illustrations 79. Price 25*s*.

THE first edition—*Exophthalmic Goiter and its Non-surgical Treatment*—came out in 1920, and it is not surprising that this " completely revised and enlarged " edition is described as in reality a new book by the author, who is the Medical Director of the Bram Institute for the Treatment of Goitre and other Diseases of the Ductless Glands. He holds the neuro-endocrine theory about exophthalmic goitre and regards it as distinct from toxic adenoma on the basis of twenty points of differentiation. Toxic adenoma is defined as a thyroid condition which gives rise to constitutional manifestations, whereas exophthalmic goitre is a constitutional condition which gives rise to thyroid manifestations. In toxic adenoma, thyroidectomy is approved as successful, whereas in exophthalmic goitre it is stated to be inconclusive in a large percentage of patients. Barbiturates are considered to be antagonistic to thyroid activity and the most suitable sedatives. The author refers to his experience gained from the care of five thousand patients with the disease.

Sex in Religion: an Historical Survey. By G. SIMPSON MARR, D.Litt., M.B., Ch.B. London: George Allen & Unwin, 1936. Pp. 285. Price 7*s.* 6*d.*

THIS historical account of the relations of religion and sex opens a vista quite unforeseen to those of the Victorian era. In primitive religions sex was regarded as neither shameful nor impure, but later with the ancient temples of Egypt, Greece and Rome, and the sacred courtesans of the Aegean Islands, the worship of fertility degenerated into mere indulgence of the flesh. The attitude of the Christian Church and St. Paul led towards the ascetic ideal, and in the middle ages and for centuries after sex was regarded as something sinful. The Victorian period did its best to deny the existence of sex, and even now, it is suggested, religion and sex are like oil and water which do not mix. Dr. Marr pleads for the help of the Church in giving instruction in sex matters and their association with religion.

The Life and Works of Charles Barrett Lockwood (1856-1914). By E. C. O. JEWESBERRY, B.M., B.Ch. London: H. K. Lewis & Co., 1936. Pp. 103. Illustrations 12. Price 3*s.* 6*d.* (paper covers, 2*s.* 6*d.*).

THIS is an admirable example of the value of awards, such as the Wix prize essay at St. Bartholomew's Hospital, for it provides not only the record of a remarkable surgeon, but a description of the already fading memories of his surroundings at that great medical school. Lockwood, who there exerted a pioneer influence on the rise of aseptic surgical technique, succumbed at the age of fifty-eight to post-operative septicæmia during the first autumn of the war. Dr. Jewesberry has done good service in collecting much in the way of personal impressions about Lockwood from his contemporaries, and writes with charm and many literary allusions.

NEW EDITIONS

Diseases of the Nose, Throat and Ear. Edited by A. LOGAN TURNER, M.D., LL.D., F.R.C.S.E. (John Wright, 20*s.*). This successful textbook, frequently reprinted and now in a fourth and revised edition, is undoubtedly the best in the English language which includes diseases of the nose and throat and diseases of the ear in one volume. It is perhaps even more suitable for practitioners than for senior students—it is admittedly difficult to know where to draw the line in the specialties for the latter; but every practitioner will find " Logan Turner " easy to read, helpfully illustrated, and a reliable reference book in problems not infrequent in general practice.

Recent Advances in Radiology in its second edition by PETER KELEY, M.D., D.M.R.E. (Churchill, 15*s.*) well maintains the reputation gained on its first appearance. Illustrations are of great importance in this subject and the 178 figures included appear to have been well selected and the reproduction of X-ray photographs is excellent.

NOTES AND PREPARATIONS

ORTHOPÆDIC DEPARTMENT IN THE EDINBURGH ROYAL INFIRMARY

Arrangements have been made for the institution of an Orthopædic Department in the Edinburgh Royal Infirmary. The Department will be under the charge of Professor John Fraser, assisted by Mr. Walter Mercer and Mr. William Cochrane. An additional staff of two clinical assistants and a non-resident house surgeon is being appointed. Clinical assistants already on the staff of the hospital will be afforded opportunity to work in the department if they so desire. The Board of Management has allocated Ward 2 for this service. It has been reconstructed and equipped in order to bring it into line with the most modern requirements for this branch of surgery.

BATH HOSPITAL APPEAL

The Royal National Hospital for Rheumatic Diseases, Bath—founded 200 years ago as the Royal Mineral Water Hospital—must be increased in size and equipped with all the latest apparatus if it is to continue to keep pace with the demands made for its services from all over the country. A site has been obtained—actually nearer to the famous hot springs—and the Governors are appealing for £200,000 to rebuild the Hospital and develop the Research Department.

NEW PREPARATIONS

DMELCOS DIAGNOSTIC VACCINE.—For the diagnosis of infection by Ducrey's bacillus (soft chancre and bubo) Pharmaceutical Specialities (May & Baker), Ltd., Dagenham, now supply ampoules containing the correct dilution for intracutaneous injection. Boxes of 5 ampoules (each containing 0·25 c.cm.) cost 5s.

LEUCARSOME.—This is a new organic arsenical drug (containing 29 per cent. of arsenic) for the treatment of amœbic dysentery and other forms of colitis. Tablets of 4 grains supply the necessary dose for adults, taken twice daily after meals for ten days. Bottles of 30 tablets are supplied by Pharmaceutical Specialities (May & Baker) Ltd., Dagenham, price 5s.

TANNA-FLAVINE JELLY.—Tannic acid, 5 per cent. in tragacanth jelly, together with ·01 per cent. acriflavine and 0·5 per cent. phenol, is now available in convenient form for the treatment of minor burns and scalds. The jelly is supplied in collapsible metal tubes, convenient for first-aid use, by The British Drug Houses, Ltd., Graham Street, City Road, London, N.1.

VERACOLATE.—Tablets containing bile salts, cascara sagrada and phenolphthalein are now marketed by William R. Warner & Co., Ltd., 300, Gray's Inn Road, London, W.C.1. They are recommended for biliary stasis, hepatic insufficiency and similar conditions in which a cholagogue action is desired.

THE PRACTITIONER

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THE BIG AIRWAY

By T. B. LAYTON, D.S.O., M.S., F.R.C.S.

Surgeon in Charge of the Throat and Ear Department, Guy's Hospital; Otologist to the Fever Service of the London County Council.

WHEN I was a dresser in the Throat Department in 1906 the dominating problem in rhinology was nasal obstruction; to-day the corresponding problem is the big airway. There are three possible explanations of this apparent paradox. My memory of the past may be at fault, my observations at the present may be incorrect, or the nasal fossæ of the urban population of London have changed in the last quarter of a century. I believe that the third is the correct explanation. If it is so the whole approach to rhinology should be changed with it. Of such a change in the incidence of a pathological condition even to its extinction within this period an example is seen in the disappearance of chlorosis. In that disease it was possible to reduce to figures much of the clinical description and to confirm this by a laboratory investigation of a mathematical accuracy. The conditions under discussion lend themselves to no such records. The amount of lymph tissue in the nasopharynx cannot be described in this way, the swelling of the mucous membrane is not assessable thereby. The clinician is dependent upon his memory of anatomical pictures rather than upon the record of any physical sign that could be reduced to writing in figures. The memory in middle age of what was seen thirty years ago must always be approached with scepticism. Such recollections may be entirely at fault, or they may be correct for a single case yet limited in range because they retain what attracted the student or specially interested his teacher at the time. In spite of this it is maintained that at that period the majority of patients coming to the out-patient department of a big clinic complained of inability to breathe through the nose. On examination in the adult the cause was found to be a condition of hypertrophic rhinitis and in the child a large mass of firm fibrous lymphoid tissue in the nasopharynx known as adenoids. Neither of these conditions is often seen to-day.

It is difficult to demonstrate hypertrophic rhinitis to the students. Certainly one case does not turn up every three months for each new batch of dressers. As an example of obstructive rhinitis its place has been taken by the various forms of vasomotor rhinitis. These do not produce so complete an obstruction and are transient in their action. The generalized hypertrophy so marked that the inferior turbinal prevented a view of the middle turbinal or of the olfactory fissure does not now happen. In such cases the pinkness of the mucous membrane was changed almost to white, but underneath was a blue-grey colour quite distinct from the rose-pink and ashen-grey that are seen on the turbinal of an asthmatic. Over the surface of the inferior turbinal were a number of pits looking like the openings of sebaceous glands. This condition of the nose has to-day disappeared almost completely, and so has the vast accumulation of lymphoid tissue in the upper respiratory tract in the young for which the operation of removing the adenoids was devised.

LYMPHOID HYPERTROPHY

It is recognized to-day that mere size is seldom if ever a reason for the removal of tonsils. The huge tonsils that were cured by removing a redundancy by tonsillotomy have disappeared. There is in the

" septic " tonsil an indication for the operation of tonsillectomy; but the concept of septic adenoids is a wrong one. The lymph tissue in this region may enlarge temporarily as a result of infection. It does not harbour organisms that live in a false symbiosis with the host. The chronic hypertrophy that used to produce this obstruction to the nasopharynx and Eustachian tubes has ceased to exist and the term " adenoids " should be abandoned. It is true that many practitioners still scrape the nasopharynx and remove thereby small masses of lymphoid tissue, calling this an " adenoid " operation. It is quite different from that of former days, being rather in the nature of a wet cupping to the mucous membrane of the nasopharynx. No doubt it affords a transient relief in a proportion of cases just as would any other form of stimulation applied to the same area. The presence of adenoids used to be determined by the post-nasal mirror and by digital examination. When the post-nasal mirror is used the hinder margin of the septum is seen rising like a pillar from the upper surface of the soft palate and at its upper end branching off like the sides of adjacent arches in the nave of a Gothic cathedral. When adenoids were present the pillar disappeared under the horizontal lower margin of the mass like the uprights of the remaining pylons of Stonehenge. In such a case when a digital examination was made it was impossible for the tip of the finger to pass the mass into the choanæ.

This condition of great hypertrophy of lymphoid tissue was a part of or closely allied to the " mucous disease " of children described by Eustace Smith in the eighties. This also seems to have disappeared. It was perhaps but a part of the wider subject of the exudative diathesis, and in a milder form may thus persist. Children with the fully developed symptoms as described by Eustace Smith or by Robert Hutchison no longer flock to the out-patient department of throat clinics as they did in the pre-war days.

ANTERIOR RHINOSCOPY

In 1912 I spent two months in Vienna. I have ever since been influenced by the great rhinologist Hajek. Except from him I am not conscious of having learnt anything during my visit but a single point in physical examination. Yet it is that physical examination that has caused me to make the observations here set forth. It is that the nasopharynx should be examined in every case by anterior rhinoscopy. This was taught by Dr. (now Professor) Hugo Frey in the Rudolfs Ambulatorium, a small clinic dealing largely with school-children to which those with established reputations did not go on their visits to Vienna. I have never met a British rhinologist who looks upon this as an essential routine of nasal examination; nor have I come across any post-graduate student who has learnt it in any British clinic. I therefore assume that it is not in general use in this country. Frey taught that if in a child the surgeon could, by anterior rhinoscopy, see the soft palate come up on phonation there were not sufficient adenoids present to warrant operation. Since 1912 I have found this an absolute guide by which to withhold the curette from the nasopharynx, but in the last ten years I have noticed that much more can be observed by this examination. It cannot be made with Thudichum's speculum, which is in general use in this country. This instrument is excellent for examining the front part of the nose, and is the only one with which any manipulative or operative procedure can be performed with precision. It is not, however, suitable for seeing the nasopharynx which can only be seen with its aid, when the nasal passage is already so large that there is danger of atrophic rhinitis. For an adequate examination of the nasopharynx the nasal speculum held from below by a handle similar to that of a pair of lion forceps or bone-cutters is necessary. It is in general use in Vienna and was first introduced into this country by Dr. Jobson Horne, whose name it bears in the catalogue of Messrs. Down Bros.

To make the examination the blades of the speculum are placed within the nostril, the left hand being on the vault of the patient's head which is bent forward, while the tip of the nose is tilted into a retroussé position. This must be done with great gentleness or it will be uncomfortable and even painful to the patient. The beam of light from the frontal mirror is then thrown horizontally backwards into the nose above and below the inferior turbinal. If the beam is returned to the eye as a light reflex this comes from the posterior pharyngeal wall. This may be confirmed by getting the patient to say " button." The mucous membrane from which the reflex is thrown back is then seen to move in distinction from that which covers the turbinals and septum. The position of this light is confirmed by the movement of the palate. In addition to gaining some evidence of the state of the posterior wall of the nasopharynx this examination gives the observer the power of estimating the size of the airway in the respiratory portion of the nose—the inferior meatus and the lower part of the middle meatus.

STATE OF THE AIRWAY

Up to the present I have not been able to reduce to figures any classification of the variations in the airway that I have observed. Nor have I, as yet, formulated any series of terms that would suitably represent these variations. A description of them may, however, be attempted. In a nose that may be considered normal without any evidence of congestion or inflammation the front end of the inferior turbinal does not touch the septum. As the curves of this structure are followed backwards they seem to come so near the septum and floor of the nose that it is impossible to see back in either of these areas nor above the inferior turbinal, between it and the middle turbinal. The result is that the posterior wall of the nasopharynx is invisible and no light reflex can be seen coming from it. In the first stage of the big airway this reflex is seen above the inferior turbinal over a small triangular area only, and it is hard to be certain that it comes from the posterior pharyngeal wall. But if a good light is thrown far back, if the eye is allowed to accommodate itself to the distance, and the patient is asked to phonate, a movement of the light demonstrates the mobility of the area of reflection.

I am not prepared to say that this is beyond the bounds of normality; but I do believe that it is at that boundary and that any case in which more of the posterior pharyngeal wall is seen should be classed as one of an excessive airway.

In the next stage a reflection of light can be seen far back below the inferior turbinal as well as above it, and there should now be no difficulty in recognizing the area from which it comes. Next the posterior pharyngeal wall can be seen between the septum and the turbinal as well as above and below the latter, so that the area of the posterior pharyngeal wall visible is cresentic in shape. It is now that it becomes possible to begin to study the movements of the soft palate. Yet another stage and the olfactory fissure is widened out by a retraction of the middle turbinal from the septum. The area of the posterior pharyngeal wall that is visible thus extends upwards between these two structures. Last stage of all, a cavernous nasal fossa gives a view to the whole nasopharynx with the opening of the Eustachian tube seen lying on its lateral wall.

I do not propose in this article to describe the appearances of the mucous membrane in these varying stages of the big airway; it may, however, be well to discuss what is the importance of these appearances. First, then, a large number of patients that come to-day to a clinic such as that at Guy's Hospital have some degree of the big airway as described above. In adults they are perhaps the majority of all patients, certainly they form the largest group. In children there are not so many, but when examined carefully there are a surprising number even in these. Secondly, they complain of a large number of symptoms that vary in different people. They are mostly of a vague nature, so that instead of attempting to describe them the patient sums them up by complaining of "catarrh." Even if it leads to nothing serious the state results in much discomfort. Thirdly, they are all made much worse by operative treatment of any kind.

A NEW RHINOLOGY

If these observations of mine are correct and are finally confirmed by impartial observers, the principles of a new rhinology must be conceived. It is suggested that these principles may be grouped under three heads:

In the first place, the conservation of the lymphoid tissue in the young and the conservation of the nasal mucosa and of the turbinals in the adult must be considered in every case. This will entail a new approach to all operative surgery upon the nose. Instead of considering primarily how much good may be done to the patient by any given operation it will be necessary to consider how much harm will be done, and whether or not this is outweighed by the potential good. In the second place the causes of this remarkable change in the upper respiratory tract of our urban population must be considered. If the year 1886 is compared with 1936 it is seen that during the memory of people still in middle age there has been a change in the life and habits of the Londoner which has been unequalled in any other generation except, perhaps, in the evolution from the palæolithic to the neolithic culture. It is possible that therein lies an explanation of this change in the nose.

In the third place, since operative surgery will be excluded, except in a very limited number of cases, such a new rhinology must develop along medical grounds. The mucous membrane of the nose is developed from the stomodæum. Embryologically it is therefore a tissue similar to the skin. During the last twenty years great advances have been made in dermatology by studying the underlying general medical conditions which allow the various lesions of the skin to occur. A similar study is needed in relation to the reactions of the nasal mucosa.

The present is opportune for such a new approach. The rapid advance in the knowledge of virus diseases bring many of these into rhinology and makes us consider whether changes long described may also come under them. It emphasizes the fact that we must separate the infections *of* the upper respiratory tract from those *through* it. This second group we can divide into those diseases in which the infecting organism crosses the mucous membrane into the blood-stream and those in which it passes into the cerebrospinal fluid by way of the peri-neural sheaths that surround the olfactory prolongations of the central nervous system.

CHRONIC SORE THROAT

By E. WATSON-WILLIAMS, *M.C.*, Ch.M., F.R.C.S.E.
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CHRONIC PHARYNGITIS

THIS may follow an acute attack, more often several acute attacks, or may arise insidiously. The complaint is usually of discomfort rather than pain, a " raspy " feeling, or " as if the bristle from a tooth-brush were sticking in the throat "; occasionally definite aching is noticed. As a rule taking food is not painful and it may definitely improve symptoms; but hot or highly-spiced foods may cause pain. The most diverse appearances may be observed; but it must be remembered that many persons who show these have no pharyngeal symptoms—an " abnormal-looking " pharynx does not necessarily connote disease. The following varieties may be recognized :—

(*a*) Chronic catarrhal pharyngitis. The mucosa of the whole pharynx is red and thick. The soft palate may also be affected. (*b*) Lymphoid pharyngitis. The lymphatic tissue of the pharyngeal wall is actually increased or unusually conspicuous (chronic tonsillitis is discussed below). The increase may be generalized and in children may appear as an extension down of the adenoid tissue of the nasopharynx. Or the pharyngeal wall may be dotted with conspicuous red patches of lymph tissue. If these are small and numerous the condition is called " granular pharyngitis." If few and large, the patient often calls them " ulcers." A band of lymph tissue running down the postero-lateral wall constitutes " lateral pharyngitis." The lymphoid patches are often thrown into prominence by contrast with (*c*) Atrophy. The mucosa is thin and pale and the submucous veins show through it. Severe degrees of atrophy may be associated with similar changes in the nasal mucosa. (*d*) Scarring of the pharynx or fauces may result from trauma, especially surgical, or occasionally from diphtheria or septic ulceration. Severe scarring may be due to lupus, but almost always severe scarring, especially if it produces adhesion of the soft palate to the posterior wall, is syphilitic. With any of these there may be a slight excess of sticky mucoid secretion, though abnormal dryness is more common. Anything more than a slight excess should be regarded as a post-nasal discharge. The nose should be examined as a routine in every case of chronic pharyngitis.

The etiology is similarly diverse, and in many cases several factors may combine to cause symptoms. Rheumatism, gout and dyspepsia are responsible for many cases, particularly the last. The pharyngitis of chronic alcoholism should be regarded as dyspeptic rather than due to direct irritation from spirits. As regards the effects of smoking, while it is true that this may increase the symptoms of chronic pharyngitis, it does not seem probable that anything short of great excess affects an otherwise healthy throat. Dental disease is a factor of great importance. Infection of the nose, and particularly of the nasal sinuses, is another. Lateral pharyngitis is almost pathognomonic of this but it must be remembered when other forms of pharyngitis are encountered, and the absence of a post-nasal discharge must not be regarded as excluding it. There are probably few conditions of which the minor degrees are more elusive.

Treatment.—The local treatment applicable in these cases is directed to diminishing the sensitivity of the part. Gargles are often much appreciated although, as in most cases none of the fluid get further back than the faucial pillars, the effect must be largely psychological. A teaspoonful of common salt, or 30 grains of alum or of potassium chlorate in a pint of water may be ordered. Many patients seem to enjoy painting the throat with Mandl's paint (Iodine 6 grains, potass. iodid. 20 grains, ol. menth. pip. 5 minims, glycerine to 1 ounce). The effects of gargles and paints are transitory, except in so far as the preparation is swallowed. More prolonged effects are obtained from lozenges, such as those of krameria or tannic acid. A single painting of the pharynx with one per cent. silver nitrate, after a cocaine spray, will often produce a very good effect. The destruction of excessive lymphatic tissue by means of the actual cautery is not advisable. In all these cases it is desirable to exclude cancer and to assure the patient that there are no signs of this: frequently this will be all that is necessary.

In those whose symptoms persist after an acute attack, a more sedative treatment may be desirable at first. Some of the most troublesome are those in which there is a feeling of "a lump in the throat all the time": this is common after influenza. Suitable lozenges are those of krameria with cocaine (1/40 grain), or benzoic acid with codeine: an iron and strychnine tonic is useful. After a week or so the sedative lozenges should be changed for astringents.

When atrophy is associated with nasal atrophy, treatment should be directed to the latter, and sedative rather than astringent applications are indicated for the throat. A spray (or gargle) containing 30 grains of sod. bicarb. to the pint will help to remove the scale of dry mucus which often clings to the posterior wall in this condition. Minor degrees of atrophic rhinitis are far more common than the classical textbook type. Any case should be so regarded in which it is possible to see the posterior wall of the pharynx by anterior rhinoscopy. In most of these a good response is obtained from the administration of a small dose of thyroid gland for several months. If this is not well tolerated iodine may be given as Lugol's solution (30 minims in water after meals) or the liquor iodi simplex (5 minims in milk or coffee) twice daily. Atrophy may also be a feature of anæmia, in which case large doses of iron are indicated.

KERATOSIS PHARYNGIS

The symptoms are those described above. The patients are often "a bit below par." Occasionally the attack begins acutely, with general malaise. I have met with two patients in whom it began always with general urticaria: some cases show a familial predisposition. On examination the pharynx and tonsils are seen to be dotted with little "horns" of heaped-up keratinized epithelium, producing an appearance which may closely resemble that of acute follicular tonsillitis: the larger masses may be uveoid. These are firmly attached and if removed leave a small bleeding ulcer. Other signs of chronic pharyngitis may be present. The condition may persist for several weeks and then disappear spontaneously, but tends to recur.

Treatment.—General tonics should be ordered; arsenic is beneficial in some cases. Tonsillectomy should be performed if the lesions are confined to the tonsils. It is little use to remove the actual "horns," as they promptly recur.

CHRONIC TONSILLITIS

In the commonest form, with large pale tonsils showing gaping crypts, symptoms are generally confined to recurrent acute attacks. The far more dangerous small flat tonsils likewise often give no sign of their infectivity (apart from such attacks, in which the local symptoms may be mild), until evidence of chronic toxæmia starts a search for the focus. Retention cysts, formed by the blocking of a crypt and its distention by decomposing epithelial debris, may produce symptoms similar to those of chronic pharyngitis, or be discovered only by accident. The cacogeusia and halitosis from the contents escaping into the mouth, or the ejection of actual hard masses of this material, may first attract attention. Suppuration or less commonly calcification, leading to tonsil " stones," generally produce local soreness. The only effective treatment for all these conditions is removal of the tonsils; age is no contra-indication. Paints are quite useless and the numerous " fancy " treatments, such as suction, ionization, infra-red or ultra-violet rays, electric cauterization, are always tedious, often expensive and seldom satisfactory in results. A retention cyst may be opened, after painting with cocaine solution, with punch forceps. The pharyngeal wall must be removed, it is useless merely to incise it.

WHEN TO ADVISE TONSILLECTOMY

Although the operation is simple and the risks, both immediate and remote, very small, it should not be advocated in a light-hearted fashion without weighing the expected gains. Symptomless enlargement or crypt retention (usually called " septic tonsils ") are not reasons in themselves for operating. It is becoming the fashion to inspect candidates for certain types of employment and to reject some " until the tonsils have been removed "—a most unfair form of oppression in times when employment is precarious. It ought to be said, however, that the recruiting departments of the Navy, Army and Air Force never insist on an operation for which there is no clinical indication.

Indications.—(1) Recurrent tonsillitis: in children, frequent colds. (*Not* otitis media, which is seldom influenced by tonsillectomy.)

(2) Cervical adenitis.—(*a*) Septic: this may be due to dental or to sinus disease as well as to " leaking " tonsils. (*b*) Tuberculous:

it is usual *in the early stages* to find the tonsils tuberculous.

(3) Conditions such as crypt retention, if causing symptoms, as mentioned above.

(4) Remote symptoms of toxæmia, such as iridocyclitis, scleritis, nephritis, arthritis and fibrositis, possibly anæmia. Here again it should be remembered that the tonsils are only one of many sources of trouble.

(5) Chronic diphtheria—i.e. in " carriers."

(6) Gross hypertrophy; the size should not be judged immediately after an acute attack.

Contra-indications : (1) Hæmophilia; *serious* lung, heart, or other systemic disease (but not a compensated valvular lesion.)

(2) Atrophic rhinitis: the patients often complain of " sore throat " when there is no tonsillitis, tonsillectomy will often increase the discomfort—and even more often will be blamed for it. Acute rheumatism is neither a reason for nor against operation: attacks are as frequent and as severe in the tonsillectomized as in others.

CHRONIC ULCERATIVE PHARYNGO-TONSILLITIS

Any ulceration of the pharynx or fauces which persists beyond a fortnight should be regarded with the gravest suspicion. The tuberculous pharyngitis which occurs in those suffering from phthisis may last much longer than this: a very rare form of chronic pneumococcal ulceration has been described. But unless there is manifest pulmonary disease *every case of persistent painful ulceration of the pharynx, or of persistent pain on swallowing, in an adult should be regarded as cancer* until it is definitely proved not to be.

Epithelioma of the tonsillar region may begin as a small nodular or flat wart, but soon ulcerates. The ulcer is painful, tender, hard, with thickened edge and little surrounding reaction, bleeds easily, progresses slowly, causing early limitation of movement of the part. It may show some sloughy debris in the depths. The pain from it is generally worse at night, and tends to radiate towards the ear. Epithelioma of the soft palate may spread rather rapidly over the surface, being shallow but with a firm edge; it may limit movement comparatively little (and sometimes resembles lupus). Occurring on the posterior surface of the soft palate, or in the nasopharynx, it may not be associated with pain on swallowing for a long time, but causes definite discomfort. Unless the nasopharynx is examined in such cases it is very easy to overlook malignant disease there until the appearance of metastases reveals the true diagnosis. Similar dysphagic symptoms when the fauces appear normal should excite suspicion of disease of the hypopharynx or pyriform fossa.

Sarcoma of the tonsil may appear at any age; the complaint of pain is unusual in the early stages, as ulceration is a later phenomena. The feeling " of a lump in the throat " is a more usual complaint. Rapid hypertrophy of one, or even of both, tonsils in an adult should invite attention. It is remarkable in how many cases tonsillar sarcoma has been incised on the mistaken diagnosis of quinsy.

The only common innocent neoplasm of this region is *papilloma.* Often there are several little, semi-pedunculated soft growths, especially round the faucial pillars. They are generally symptomless, and if pain or ulceration occurs should not be regarded with complacence. They should never be treated by chemical or electrical cauterization.

The ulceration of *lupus* occurs in the pharynx of those who have lupus of the nose, hardly ever otherwise. It is seldom painful, though it may cause discomfort. The ulcer is shallow, indolent, soft, does not bleed easily, and the edge is thin, irregular and " mouse-nibbled ": often there is healing in one part while in another it is progressive, and the scars are thin, whitish and supple.

Gummatous ulceration of this part is generally almost painless, and may be very rapid. The ulcer is deep, with " punched out " edge and sloughy base, and surrounded with considerable œdema. Limitation of movement and, especially if the palate is involved, muffled voice are early symptoms. Gumma of the soft palate tends to ulcerate first on the nasopharyngeal surface, and demands immediate treatment if gross deformity is to be avoided.

Actinomycosis may begin in the tonsil, with pain, swelling, and early limitation of movement of the jaw as well as of the palate: some malaise is usual. The swelling is red, wooden-hard, but only slightly tender. Within a few days sinuses appear, and begin to discharge the characteristic thin, sanious pus in which it may be possible to distinguish the tiny yellow granules of the fungus. The diagnosis is confirmed by microscopical examination. Treatment is by large doses of iodine.

The differential diagnosis of chronic ulceration in this part is to distinguish syphilis from cancer, and is best effected by giving potassium iodide in large doses immediately; 30 grains should be given thrice daily with an equal amount of sod. bicarb. in two ounces of water. Unless there is definite improvement—in fact, obvious healing—within one week the condition should not be regarded as syphilitic. It must always be remembered that a patient with a positive Wassermann reaction may be suffering from cancer and that neither syphilis nor dental disease is likely to be responsible for a hard, irregular and painless gland in the neck, however mobile.

Pain on swallowing or on speaking may be due to the conditions just discussed affecting the hypopharynx or larynx—in the latter case hoarseness is usually added. But the appearances are so diverse and the difficulty of distinguishing early malignant disease in this region from innocent conditions so great that every patient in whom these symptoms persist beyond a fortnight should be examined by an expert in indirect laryngoscopy. It should also be remembered that cancer of the vocal cord is painless for weeks after the onset of hoarseness.

HOARSENESS

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HOARSENESS and weakness of the voice are often found together, but the conditions are different and must be carefully distinguished. " Hoarseness " is a roughening or huskiness of the voice and is often present when the voice is strong, as can be proved on any parade ground. For the voice to be produced clearly the edges of the vocal cords must be straight and sharp, and must be brought into contact with each other along their whole length. If the edges of the cords cannot meet properly, the voice will be weakened or entirely lost (" complete aphonia ") according to the degree of failure of approximation. If the edges of the cords are at all roughened, even by a little crusted mucus, or if the edges are not quite sharp (when, for instance, the cord is swollen so that the edge is lost, or when the internal tensor muscles which normally keep the cord tightly stretched are weak) the voice will be hoarse. As anything which roughens the cord produces hoarseness it is obvious how vitally important this symptom is, for " anything " includes a little mucus at one end of the scale and a carcinoma of the cord at the other. It should be laid down as an absolute rule that if a patient is hoarse without remission for three weeks a laryngoscopic examination must be made. Only those cases will be discussed in which hoarseness is the predominant symptom.

ACUTE CATARRHAL LARYNGITIS

This may occur in any of the acute infectious fevers, or it may be produced by any severe irritation, even by violent abuse of the voice (an illustrative case is that of a patient who appeared regularly with an acute laryngitis after every international match at

Twickenham), but the most frequent cause is an acute coryza or other nasopharyngeal catarrh in a patient who smokes too much, consistently produces his voice badly, or otherwise ill-treats his larynx. Sometimes the first sign is in the larynx, but the usual sequence is first the nasopharyngeal signs and then the laryngeal. The first laryngeal sign is usually a "tightness" or "stiffness" in the throat. There is often pain on talking or swallowing. Hoarseness is an early and prominent sign; it may go on to aphonia, although this rarely lasts long. The hoarseness is usually at its worst in the morning, especially if the nose is blocked and the patient has been sleeping with his mouth open.

The *diagnosis* is generally easy. In the acute suppurative conditious of the pharynx and tonsil the changes in the voice are slight in comparison with the pain and dysphagia; in acute œdema of the larynx the hoarseness is overshadowed by the respiratory difficulty; the mildness of the general symptoms in acute catarrhal laryngitis distinguishes it from early laryngeal diphtheria. Laryngoscopic examination confirms the diagnosis at once. In the earliest stages the laryngeal changes seem slight compared with the symptoms, but very soon uniform redness and congestion follow, often with swelling of the cords, and free mucoid discharge. The uniformity of the changes is typical; a unilateral laryngitis is so rarely a simple catarrhal condition that it should arouse the gravest suspicions. The causal coryza and influenza must be treated. Locally relief is given by inhalations of tinct. benzoinæ co. in steam and sprays of plain liquid paraffin with chloretone.

For the *treatment of hoarseness* the most important point is complete vocal rest. The patient must not attempt to speak during the acute stage, and when the pain is relieved, which usually happens as soon as the catarrhal exudate becomes free, he must be warned to use the voice very little. This is especially the case with singers; after an attack of acute laryngitis there is usually some weakness of the internal tensors, and any strain on the cords may cause severe, sometimes permanent, damage to the singing voice. There must be no attempt to sing or raise the voice until the cords are clear and white. When the acute stage has passed, recovery is helped by the free use of an oily spray directed down into the larynx during inspiration with a nebulizer with a long tube and an adjustable tip; direct injection into the larynx with a laryngeal syringe of a few drops of five per cent. cocaine with adrenaline, or of five per cent. menthol in paraffin is useful. While this is being done the patient should sound a long " e–e–e " to approximate the cords and expose their upper surface to the fluid. This must always be done under inspection with the laryngeal mirror, and must never be attempted during the acute stage. During the stage of recovery smoking must be absolutely forbidden. Fresh air is good, but crowded rooms, stuffy railway compartments, draughts and fog should be avoided. It is wise to bear in mind that a badly ventilated closed car can supply all the deleterious factors at once.

Acute catarrhal laryngitis in children is not discussed here, as the problems it presents are entirely different. The larynx in childhood is so small that even catarrhal inflammation is dangerous rather than troublesome, and the hoarseness is unimportant compared with the respiratory obstruction.

SUDDEN HOARSENESS

Sudden hoarseness without any previous signs is uncommon; it may occur in acute laryngitis, and it is sometimes caused by *hæmorrhage into a vocal cord* due to the rupture of a small blood vessel. This happens to singers who force the voice in a sudden violent effort. It can also be caused by a blow on the larynx.

In one case a powerful man was struck across the larynx by a squash racquet. Immediately after he could only speak in a hoarse whisper, and laryngeal examination showed a submucous hæmatoma entirely covering one cord.

The treatment is *absolute* vocal rest until the surface is clear. Any attempt to speak may bring on another hæmorrhage. Any violent muscular exertion must also be forbidden, as muscular effort entails forcible closure of the glottis and tension on the cords. Finally, in unexplained sudden hoarseness there is always the possibility of damage by an inhaled foreign body. This is fortunately rare, but it must always be remembered, especially in children, and in adults who notice the hoarseness on recovery from an anæsthetic or a drinking bout.

CHRONIC CATARRHAL LARYNGITIS

Chronic catarrhal laryngitis is nearly always the result of a combination of factors, of which vocal abuse, either by excessive use or by faulty voice production, is usually only one. The predisposing cause is nearly always not in the larynx itself. Nasopharyngeal irritation is the commonest cause of all. This may be due to nasal obstruction, for example by deflections of the septum, or to accessory sinusitis. Once a nasopharyngeal catarrh is established irritation of the larynx can be produced in a number of ways; there is the irritation of pus or mucus dripping down over the larynx from above, and the further irritation caused by coughing and "clearing the throat"; there is the spread of the catarrhal inflammation by continuity over the surface of the pharyngeal mucosa; lastly there is the further irritation if the nasal process causes bronchitis or tracheitis. To these must be added the continual strain of talking with cords irritated by the dropping mucus, and, when nasal obstruction is severe, mouth-breathing with continual inhalation of unwarmed and unmoistened air.

On the whole, catarrhal infections of the nasal sinuses seem to cause this kind of laryngitis more often than do the suppurative infections, which are responsible for the crusting form (laryngitis sicca), and infections of the antrum, sphenoid and posterior ethmoid more often than those of the fronto-ethmoid. Deflections high up on the septum rarely cause laryngitis unless they are accompanied by sinusitis, but low-lying spurs which obstruct the airway frequently do.

Adenoids and enlarged tonsils must be very unusual causes of chronic laryngitis as the condition is far more frequent in adults than in children. Tonsillar sepsis is not at all a common cause of laryngitis, although dental sepsis undoubtedly is. Patients with hay fever often suffer from laryngitis, but the appearance of the larynx in such cases suggests that the condition is due to the nasal obstruction and the irritation of the dropping mucus, not to a specific sensitivity of the laryngeal mucosa. In cases in which the laryngeal mucosa shares an allergic sensitivity the resulting condition is not laryngitis but œdema, a much more formidable matter. Tobacco, alcohol, dust and chemical fumes may all contribute as accessory factors. Lastly, as Sir St Clair Thomson has pointed out, chronic laryngitis may accompany pulmonary tuberculosis without any definite tuberculous change in the larynx.

The *diagnosis* depends on the chronicity of the condition, with occasional exacerbations and fluctuations, and on the appearance of the larynx. This varies greatly according to the duration of the condition; small blood-vessels are often seen on the cords, which are dull and often swollen, sometimes quite red; there is often " heaping up " of tissue posteriorly in the interarytenoid region and sometimes the ventricular bands are also swollen. But the important thing is that these changes are bilateral and symmetrical; there is no ulceration and the cords move freely, although sometimes the long-standing weakness of the internal tensors or the posterior thickening prevents full approximation of the cords.

Treatment is not easy. There is no danger to life, and there is no evidence whatever for regarding chronic laryngitis as a pre-carcinomatous condition; but it does not clear up spontaneously, and may go on to a chronic hypertrophic form. First of all the causal factors must be found and dealt with. It is useless to treat the larynx while it is being flooded all the time with a mucopurulent post-nasal discharge. Vocal rest is of the utmost importance, but unfortunately it is seldom possible to impose this for a long enough period. Usually we must be content with forbidding singing, public speaking and other obvious laryngeal insults, and making the patient use his voice as little as possible and speak as softly as possible Whispering is not to be regarded as a safe substitute for speech, because many people adopt a "forced whisper" which is really a hoarse croak and brings the cords into action. At a later stage it is often well worth while to try a course of voice production and breathing exercises under an expert teacher.

For local application a spray of menthol, camphor and chloretone, five grains of each with five minims of eucalyptus to an ounce of liquid paraffin, or if there is much catarrhal secretion, a watery spray of potassium chlorate, bicarbonate of sodium and borax, ten grains of each to an ounce, should be used. A good soothing spray is one containing ten grains each of sodium benzoate, sodium bromide and antipyrin, with tincture of aniseed and glycerine made up in watery solution. Menthol in paraffin applied directly to the cords with a laryngeal syringe is often much appreciated, but beyond this the less "direct action" taken against the cords the better for the patient; attempts to "stimulate" recovery by strong astringents or caustics may cause an acute exacerbation at the end of which the mucosa is more damaged than it was before. The weakness of the internal tensors will pass off as the condition of the cords improves.

The general treatment of the patient, apart from his voice, is of great importance. He must watch for any recurring circumstance, however trivial or apparently absurd, which seems to increase the laryngitis. When the condition is worse in the winter colds and chills are the most constant recurring factor, and when these are slight the patient is apt to disregard them.

In one case a patient noticed that his laryngitis was always worse on Mondays. It was discovered that on Mondays he drove up from his country house in a closed car to a station in the outer suburbs. He then waited in a cold station, completed his journey in a crowded and tobacco-laden compartment, and drove in the usual cold and draughty taxi to his office. After this course of stewing and freezing he usually felt a " little chilly ", but he did not connect cause and effect.

The continual slight re-infection risked by travelling in buses and underground trains surrounded by coughing and trumpeting humanity is another important factor; probably the improvement so often seen when a patient goes to live in the country is largely due to the absence of this particular advantage of urban civilization. Patients frequently try to avoid these recurrent colds by the use of strong nasal antiseptics or rather astringents. As a general rule this should be discouraged; the mucosa in these patients is too sensitive to endure rough treatment. In some cases an autogenous vaccine will assist immunity, but with all cold-vaccines the dosage must be very carefully graduated and the " good reaction " which is still sometimes spoken of as a desirable result must be most rigorously avoided. A simple precaution for city workers is to keep spare socks at their office and change into them as soon as they arrive in the morning. On the other hand the patient with chronic laryngitis must not be coddled into premature invalidism. He should be encouraged to continue games or field sports in reason, but he must observe a reasonable restraint. Fresh air is an essential in treatment. The patient must never sleep with his windows shut. In cold weather it is much better to rely on hot water bottles, and if need be to keep a fire on all night, than to sleep in a stuffy atmosphere and go out next day to raw morning air.

In severe cases, if the patient can manage it, he should escape, if only for a time, to some milder climate. For a short period, the south-west of England has many advantages. Too often patients who go to the Mediterranean, after being parboiled in a wagon-lit and frozen on the Channel crossing, return with a violent cold and a severe exacerbation of laryngitis. Dry cold mountain air, the hotel life, and the return journey make winter sports a most unsuitable occupation for these cases.

When the laryngitis is worse in summer suspicion should be directed to dust as the irritant. An ointment of white and yellow vaseline and the free use of a spray of liquid paraffin give the mucosa a protective coating and help considerably. The most difficult cases are those where the laryngitis is secondary to bronchitis. Here a course of inhalations of fine oily vapours, delivered by an electric pump, is advisable. These patients are often benefited by a course of spa treatment.

Nodular laryngitis or "*singer's nodules*" is a peculiar kind of chronic laryngitis caused by vocal abuse. The characteristic feature is a small rounded prominence on each cord, generally on the margin. The treatment is complete vocal rest; they then usually disappear. In obstinate cases the nodules may have to be removed with forceps, but this is a most delicate procedure.

Mention must be made here of the *laryngeal paralyses*. These cause aphonia or stridor rather than hoarseness. In the early stages of *abductor paralysis* there may be some hoarseness, but stridor and dyspnœa are more usual. The presence of an abductor paralysis demands a thorough investigation of its cause, which is outside the scope of this article.

In laryngitis, whether acute or chronic, the characteristic feature is the bilateral uniformity of the lesion. If the patient is hoarse and examination shows a unilateral abnormality, suspicions must be at once aroused.

TERTIARY SYPHILIS OF THE LARYNX

This is now comparatively rare, but it still occurs with sufficient frequency to be a possible cause of confusion in diagnosis. It is found in any of three stages, gumma, ulceration, and induration with scarring. The gumma is usually found on the epiglottis, especially on the lingual surface, the ventricular band or on the ary-epiglottic fold rather than on the cord. The ulcer is deep and punched out, with the usual sloughy base, sharp edges and surrounding œdema. The greatest difficulty is in the cases with scarring and induration. Here a cord may be fixed, and it is difficult sometimes to distinguish the condition from carcinoma. In a doubtful case the Wassermann reaction, repeated if necessary after a provocative dose of N.A.B., must be tested, and a course of iodides administered. But it must not be forgotten that syphilis can co-exist with carcinoma or with tuberculous laryngitis.

TUBERCULOUS LARYNGITIS

In its early stage this condition is often marked by hoarseness and weakness of the voice without any other local symptom. Later on, when ulceration begins, the predominant symptoms are pain and dysphagia. In the early stage the feature which arouses suspicion is a chronic unilateral laryngitis, especially if there is a swelling of the ventricular band. Any thickening of the laryngeal surface of the epiglottis or swelling in the interarytenoid region is strong confirmation. The classical pallor of the larynx and palate is not constant. Examination of the sputum is often negative until ulceration starts, but a skiagram of the chest may supply the proof. It is vitally important to detect the disease before the signs of ulceration appear.

NEW GROWTHS OF THE LARYNX

The most common innocent tumour of the larynx is the *papilloma*. It may be found at any age, but is far more common in patients under 40. Continued hoarseness in a child should always raise the suspicion of a papilloma. As a rule the diagnosis is easy. There is no evidence of infiltration about the base or spread into the cord; there is usually a long history, and the age of the patient supports the diagnosis. The only treatment of the hoarseness is removal of the tumour.

Carcinoma of the larynx differs entirely in course, symptoms and prognosis according to its site of origin. *Extrinsic cancer,* that is cancer starting outside the "laryngeal box," in the arytenoids, pyriform sinus or post-cricoid region, does not cause any interference with the voice until it spreads into the larynx proper, or invades the nerves. Hoarseness is a late sign, and by the time it appears the diagnosis is usually only too well established. *Intrinsic carcinoma* starts in the bands or cords or below and is strictly limited to the interior of the larynx for some considerable time. So long as it is so limited, the chances of complete cure are good, and the earlier the diagnosis is made, the better is the chance. Hoarseness is here the most constant as well as the earliest sign, and it cannot be too strongly emphasized that continued hoarseness must never go undiagnosed. Fortunately hoarseness precedes fixation of the cord. That does not happen until the muscles of the cord are invaded, and once the cord is fixed the chances of cure are not so good. The appearances are variable, but a unilateral irregularity on one cord, usually sessile and rough with thickening about the base, is probably the most common early manifestation. Sometimes there is only a thickening of one cord, but all such cases, especially in a man over 40, must be most closely watched. If there is no improvement with vocal rest, the condition is probably a carcinoma.

THE TREATMENT OF NASAL CATARRH AND ITS SEQUELS

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NASAL catarrh is one of the most frequent phrases on the lips of patients and it is a phrase which covers a number of conditions, ranging from an acute catarrh or cold in the head to atrophic rhinitis with ozæna. Between these lie spasmodic rhinorrhœa, sinusitis with purulent discharge, sinusitis with nasal obstruction but slight discharge, and post-nasal discharge from whatever cause. Some of these conditions arise from causes other than " a cold." For instance, purulent rhinitis may be due to suppuration in the maxillary antrum infected by a septic tooth. Spasmodic rhinorrhœa is an allergic condition and in no way infective. Many cases, however, of nasal catarrh do occur as sequels of infection by " a cold " and it is these which must be considered here.

Generally speaking it is very unlikely that chronic catarrh would exist were it not for acute catarrh.

Acute nasal catarrh, the " common cold," is one of the real ills of modern life, and is responsible for a large proportion of complications. Apart from the specific fevers the common cold is responsible for the vast majority of illness in children. Droplet infection is the method of spread, through coughing and sneezing, and is particularly apt to occur in crowded places, tubes, cinemas and theatres in which ventilation is poor. Poulton has shown that infection by coughing can be projected seven feet. The importance of transference of infection has long been recognized, and is reflected in the modern construction of hospital wards, especially children's wards, in which ideally the cots or beds are separated by glass partitions. If isolation of, or the wearing of gauze masks by, those suffering from "colds" were compulsory or fashionable, the extensive epidemics of colds and so-called influenza would be greatly diminished. In some throat clinics the medical officers use special celluloid or glass shields attached to their forehead mirrors to prevent infection from patients by talking or coughing while under examination.

The cause of the common cold is a filter passing organism resembling the virus of poliomyelitis.[1] Its isolation is claimed by recent workers; Dochez, Mills and Kneeland claim that even remote subcultures have been found to produce colds in human volunteers[2] though this has not been confirmed.

Some have a natural immunity from colds; in others the severity of the infection varies greatly and this may well be due to the presence in the upper respiratory tract of various organisms which lead to secondary auto-infections. This contention would appear to be supported by cases in which removal of infected tonsils and adenoids leads to marked diminution in the frequency and severity of colds. On the other hand removal of tonsils in children by no means confers immunity from colds—rather, colds then attack the lower respiratory tract and may cause laryngitis, tracheitis and bronchitis.

Prophylaxis of nasal catarrh still remains vague and unsatisfactory. Doubtless the best treatment is to avoid colds and maintain normal health, an ideal hard to achieve. Some believe in daily cold baths, some in special forms of underclothes. Locally, sprays of paraffin with small amounts of menthol, 1 or 2 grains in an ounce of paraffin, or eucalyptus oil 3 minims, also in one ounce of paraffin, can be used in an atomiser two or three times a day when exposure to infection is expected. The question of vaccines given prophylactically is a vexed one. In any case the vaccine can only be directed against the secondary infecting organisms, which vary much. A mixed anti-catarrh vaccine, therefore, is given made from staphylococci, pneumococci, streptococci and *B. catarrhalis.* In the hands of many, good results are obtained and general practitioners who treat large numbers of patients —generally in the autumn—report complete success in 50–60 per cent., some degree of success in another 15 per cent., and failure in the remaining 15–20 per cent. Some years ago chlorine gas inhalation over an hour and a half was used extensively as a prophylactic measure, and as treatment of nasal catarrh. The chlorine concentration was roughly 1 part of chlorine gas in 100,000 parts of air, and this resulted in reasonable success, according to American writers.

The ideal *treatment* of an acute cold is rest in bed in an equable temperature, light diet, and large amounts of bland drinks, lemonade, barley water or tea. Many patients have no general symptoms and insist on pursuing their usual occupations and spread their infection to fellow workers. Locally, Glegg's treatment has many adherents; vaseline 1 part and liquid paraffin 3 or 4 parts is poured into the nose two or three times a day. If used in early stages the cold may be aborted, and in any case the nasal symptoms are mitigated (Poulton[1]). The amount used is sufficient to pass into the nasopharynx and be swallowed: it then has a laxative effect. A spray of liquid paraffin delivered from an atomizer may be used several times a day as an alternative to Glegg's mixture.

The duration of the cold is very variable; if the patient has a high degree of immunity the running from the nose and sneezing may last only for a few hours, and in favourable circumstances symptoms may all disappear in two or three days in spite of the old saying that a cold take three days to come, lasts three days and takes another three to go. Actually it is more common for colds to pass from the stage of sneezing and running of clear fluid from the nose to a stage of mucopurulent nasal discharge; this is due to a secondary infection which can come from outside or may exist in the patient. This *focus of infection* in the patient is of prime importance—the presence of adenoids certainly predisposes to colds. Occasionally tonsils supply a focus of secondary infection but removal of tonsils will not always prevent colds. In adults a hidden sinus infection certainly predisposes to the secondary infection in colds. Indeed such a sinus infection may be completely latent and innocuous until some factor arouses it, for instance, a " chill " or unwonted exercises, when severe rhinitis may occur. This question of a latent sinus infection is one of great importance and patients who suffer from even mild chronic nasal catarrh, often signalized by post-nasal discharge, must be thoroughly examined, if necessary by X-rays, in an attempt to discover the cell or cells affected. Should local treatment fail, operation to insure adequate drainage should then be carried out.

The *results* of acute nasal catarrh are swelling of the nasal mucous membrane and increased secretion of mucus to deal with the additional organisms. The result of this is loss of sense of smell and nasal obstruction, especially at night. Inhalations of steam from hot water to which have been added a few drops of menthol dissolved in paraffin, are helpful at this stage. As long as the infection is not too severe the function of the nasal ciliated epithelium continues and recovery goes forward. Should the infection be so severe that the cilia fail in their work of sweeping away the organisms in the mucus, the cold continues till such time as the defences of the body overcome the local infection. Until this occurs the patient feels the effect of toxins, the temperature is somewhat raised and malaise is experienced. Infection may pass to the pharynx and larynx, and lead to laryngitis, tracheitis, and even bronchitis and pneumonia.

RHINITIS IN CHILDREN

Rhinitis in infants and young children deserves separate mention as the results are much more severe than in adults. The nasal obstruction in infants prevents the proper taking of the breast; intestinal infection, which often occurs, gives rise to diarrhœa and sickness, and bronchitis and pneumonia are frequent complications. It must be emphasized that almost any illness with rise of temperature in infants for which no adequate cause can be found is due to otitis media; particularly is this the case should the infant have had " a cold."

It is evident therefore that infants should be protected from colds by every possible means. In children ear infections are common and sinus infection, particularly antral, occurs in over 20 per cent. of cases.

NOSE AND EAR SEQUELS

The two important nose and ear sequels of acute rhinitis are infection in the paranasal sinuses and in the middle-ear tract.

ACUTE SINUSITIS

Any of the paranasal sinuses may be involved. The nasal openings of the maxillary antra, the frontal sinuses and anterior ethmoidal cells are hidden under the middle turbinal. Since these openings are relatively small and in some cases overhung by the middle turbinal, any swelling of the mucous membrane round the openings may prevent the escape of the normal mucus from the sinuses. This retention results in pain described as headache. Should obstruction continue, infection may follow, and this results in acute suppurative sinusitis.

Treatment of the acute sinus retention or infection has been touched on. Essentially it consists in restoring drainage of the affected sinus or sinuses. A considerable percentage of patients with a head cold complain of headache. The position of the headache varies with the sinus affected. The frontal sinus and maxillary antrum give rise to pain over the eye; the anterior ethmoidal cells to pain at the root of the nose or "between the eyes"; the sphenoidal sinus and the posterior ethmoidal cells to vertical or occipital headaches, pain behind the ears and sometimes frontal pain. To relieve the sinus retention, the nose may be sprayed with a solution of adrenaline chloride (1 in 3,000) at intervals of three to four hours, followed by inhalation of menthol in steam; a few drops of a solution of menthol (2 grains in one ounce of parolein) are added to a jug of hot water and the steam inhaled. Should the pain be severe and resistant to this treatment, a radiant heat "bath" is very useful. The whole head is enclosed in a wooden cage, within which are several electric lamps giving out heat. The patient lies down with the head in the cage for ten to twenty minutes twice or thrice a day. Recently, short-wave diathermy has been found to be helpful. As an alternative to the spray, pledgets of wool moistened with a solution of 10 per cent. cocaine and adrenaline (1 in 1,000) in equal parts, are placed on the anterior end of the middle turbinal and left *in situ* for ten to fifteen minutes. This application is made twice a day, and is most effective.

Proetz's so-called displacement treatment is very useful, especially for the posterior sinuses, and may be applied daily or twice a day. The patient lies down with the head hyper-extended by means of a pillow under the shoulders; 5 to 10 c.cm. of a ½ per cent.

solution of ephedrine in saline is run into the nostril, the mouth being kept open to prevent swallowing the fluid. Suction is then applied by means of a bulb and glass tube which fits one nostril the other being held closed. While suction is being applied the patient keeps the soft palate raised by making the C–K sound, repeatedly saying kick, kick. The suction withdraws air from the sinuses and allows the ephedrine to enter; relief of pain may be dramatic after this treatment.

Should these local measures fail and pain continue, surgical intervention is called for.

MIDDLE-EAR INFECTION

The other sequel of acute nasal catarrh is middle-ear infection. The Eustachian tube becomes infected, and its mucous membrane swells, and so prevents the normal opening of the tube on swallowing. The result is some degree of deafness and discomfort in the ear. Should infection spread along the tube a definite otitis media occurs. This may be catarrhal otitis, sometimes with a mucous exudate in the middle ear; in other cases suppurative otitis media results. The *treatment* of otitis media, catarrhal or suppurative, is instillation of drops of glyc. acidi carbolici, warmed, every three or four hours.

When the acute nasal catarrh has subsided inflation of the Eustachian tube by means of the catheter or politzerisation should be practised, and this will often relieve the symptoms and restore the ear to normal. Should suppuration follow, incision of the membrane will be required; further discussion of suppurative otitis is outside the scope of this article.

CHRONIC CATARRH

Fortunately most cases of acute rhinitis resolve; should resolution fail, chronic rhinitis follows; the causes of non-resolution are re-infection or autoinfection from some focus in the nose, sinuses, nasopharynx or tonsils. Another factor that makes for chronic rhinitis is a mechanical defect in the nose, causing obstruction: e.g. a deflected septum.

Chronic rhinitis may be either hypertrophic or atrophic; fortunately the former is far the commoner.[3] The mucous membrane of the nose becomes thickened in various areas, notably middle and inferior turbinals.

The treatment will depend entirely on the discovery of the infecting focus in the nose. Since the majority of cases of chronic rhinitis are due to some hidden infection in a paranasal sinus the treatment consists in discovering and draining the offending sinus.

Should no sinus infection be present local treatment should be instituted; sprays or "nasal packs." Liquid paraffin with menthol, 2 grains in each ounce, used in an atomiser three or four times a day is useful; a watery solution is sometimes useful, consisting of salt 60 grains, and sod. bicarbonate 60 grains, in a pint of water, used in a nasal spray three times a day.

For cases in which obstruction is a marked symptom, an argyrol pack is sometimes successful. Ribbon gauze (½ inch) moistened in a solution of 10 per cent. argyrol in equal parts of glycerine and normal saline is packed into the nose as far back as the middle turbinal, and left in the nose for one to four hours. This treatment is repeated daily, right and left sides alternately.

Should the mechanical obstruction be obvious operative treatment to correct it is indicated; e.g. a submucous resection of the septum or removal of the anterior ends of the middle turbinals.

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CHRONIC NASAL SINUSITIS AND ITS TREATMENT

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THE treatment of chronic nasal sinusitis is a subject that has given rise to a great deal of controversy in recent years. The consensus of opinion in this country is much more towards conservative measures than it is, for example, in America, where the treatment most widely advocated to-day is extremely radical surgery, with absolutely complete removal of the mucous membrane lining affected sinuses. It is unfortunate that nasal discharge frequently persists even after radical operation, and the purpose of this article is to review the present position and to examine the problem of chronic nasal sinusitis and its treatment from the point of view of the general practitioner rather than that of the specialist.

Every patient who complains of persistent "nasal catarrh" should be suspected of chronic nasal sinusitis, which is by no means always purulent but may give rise to a mucous discharge only. A one-sided nasal discharge is almost diagnostic of a nasal sinusitis, and other common signs and symptoms are persistent headache, frequent head colds, an unpleasant smell or taste, undue tiredness or lack of mental energy. A very slight nasal discharge will cause intense misery to some individuals, while others—sometimes highly educated people—will go on for years quite cheerfully with a persistent foul discharge and even with nasal polypi projecting from the nostrils.

TRANSILLUMINATION

It is not easy for a practitioner unaccustomed to examining the nose to make out whether there is pus in the middle meatus or whether an enlarged middle turbinal is or is not a nasal polypus, and in any case there may not be any suggestive signs in the nasal passages. It is useful therefore to carry out a routine transillumination of the nasal sinuses in every patient who complains of nasal catarrh—not forgetting to look at the pharynx, for the condition may be due to septic tonsils keeping up an unhealthy condition of the post-nasal space and nasal passages. Transillumination as a method of diagnosis has had as many severe critics as staunch supporters. Its use preceded the discovery of X-rays, and undoubtedly this is a much more satisfactory method, but transillumination can be practised by anyone with a small electric bulb and a darkened room—the room need not be pitch dark. The outline of the frontal sinuses is usually easily revealed when the bulb is placed under each eyebrow; and when the bulb is placed in the mouth and the lips closed, the light usually shines through the anterior walls of both maxillary antra and shows a crescent of light under each eyeball—frequently the light passes through the eyeball and lights up the pupil of the eye. If one maxillary antrum is diseased the difference between the two sides is usually very definite, the healthy side being lit up and the unhealthy one dark. Another method of transilluminating the maxillary antra is to place the electric bulb just above the brim of the orbit, and the observer looks at the patient's palate through his opened mouth (Fig. 1). In this method each antrum must be examined separately and there is no opportunity of comparing the translucency of the two antra simultaneously; but it has the advantage that the light passes

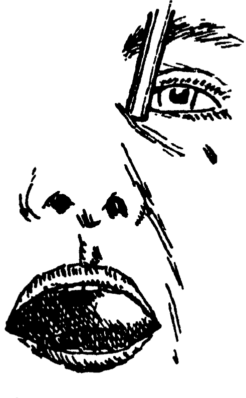
FIG. 1.—Transillumination of the left maxillary antrum through the orbital wall.

through much less tissue, for the wall of the orbit is very much thinner than the wall of the cheek. Among the critics of transillumination is Eric Watson-Williams[1] who some years ago carried out this method of diagnosis in a series of 259 cases and found subsequently by other more accurate methods of diagnosis that 20 per cent. of the cases of nasal sinus disease would have been overlooked by transillumination alone. It is undoubtedly true that transillumination is not always accurate, but it is helpful, especially when it is positive, and it is simple, needing no elaborate apparatus. Puncture and suction of the nasal sinuses, as carried out by Watson-Williams, is beyond the scope of the average general practitioner, nor can Lichtwitz's trocar and cannula be recommended for general use, for even expert rhinologists have been known to pass it right through the wall of the antrum into the cheek or the orbit. If transillumination is negative or indefinite and the symptoms demand further investigation, X-ray examination of the nasal sinuses should be carried out.

X-RAY EXAMINATION

Although the complete examination of all the nasal sinuses still taxes the ingenuity of the expert radiologist and even the elaborate technique of standardized positions for the head and the injection of lipiodol may fail to unveil the true condition of the sinuses that subsequent operation reveals, yet an X-ray examination of the nasal sinuses which will give valuable information can be carried out by any practitioner who knows how to work an ordinary X-ray plant. An ordinary antero-posterior skiagram, whether taken with the patient standing up or lying down, is of little use; thus Fig. 2 shows how in such a skiagram the superimposition of shadows of the petrous portions of the temporal bones causes apparent opacities of the maxillary antra. Yet not infrequently one is even to-day asked to give an opinion on the evidence of such a skiagram, and one has known of patients having their maxillary antra operated upon merely because such a skiagram had seemed to bear out their symptoms of nasal catarrh.

All that is necessary, however, is for the radiologist to raise the patient's chin so that an imaginary line from the external auditory meatus to the outer canthus of the eye (the orbito-meatal line[2]) subtends an angle of 45 degrees to the film. In such a position the petrous portions of the temporal bones are thrown clear of the antra, and the latter are consequently well seen, as in Fig. 3, which is a skiagram of the same patient as Fig. 2. This occipito-mental skiagram gives a good view of the frontal sinuses as well as the maxillary antra, and may also give useful information regarding the ethmoidal cells. For more exhaustive information it is necessary to have the help of a radiologist who is well accustomed to the examination of the nasal sinuses.

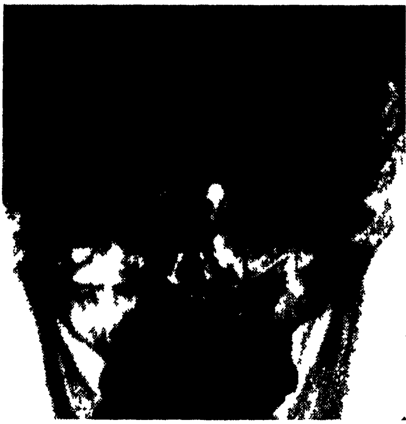

FIG. 2.—Antero-posterior skiagram of the nasal sinuses, showing how the superimposition of the petrous portions of the temporal bones causes apparent opacities of the maxillary antra.

FIG. 3.—Skiagram of the same patient, showing how raising the chin throws the petrous portions of the temporal bones clear of the antra. In this case there was no disease of the nasal sinuses.

There is still a great deal of work to be done on the correlation of X-ray appearances and the clinical findings by puncture and suction or by operation, and the constantly improving technique of radiological examination is bound to show more precise results in the future. The use of radio-opaque substances, such as lipiodol, has on the whole been disappointing: it adds little to the value of an ordinary good skiagram of the frontal or maxillary sinuses; it is useful, though not really necessary, in sphenoidal sinus cases; and it is not at all helpful as regards the ethmoidal sinuses, as lipiodol is not certain always to fill healthy sinuses or to indicate diseased ones.

SURGICAL TREATMENT

Repeated puncture and lavage will often clear up an infected maxillary antrum, but radical surgical treatment in chronic nasal sinusitis should be done only when conservative treatment has proved of no avail or, after due consideration, when the pathological condition is so gross—such as long-standing nasal polypi or foul pus—that conservative treatment would be useless. If radical operation is decided upon, it must be adequate: not infrequently suppuration in a frontal sinus persists because the ethmoidal cells have not been adequately treated or an infected maxillary antrum has been overlooked and left untouched, and in the same way overlooked frontal or ethmoidal disease may be the cause of persistent discharge from an antrum. It may be necessary to provide better nasal drainage by correcting a gross septal deviation, but this is best carried out after any sinus suppuration has been cleared up, though some rhinologists—in my opinion rashly—do a septum resection at the same time as they operate on a diseased nasal sinus. It may be necessary to dissect out septic tonsils before a nasal discharge clears up, even after adequate drainage of an infected sinus. On the other hand, persistent discharge from a nasal sinus after it has been operated upon does not necessarily demand further and more radical surgical measures. Many factors require to be taken into consideration before these are decided upon.

The patient's manner of life and habits, his diet and the atmosphere in which he works may all be of importance. Persons who are heavy eaters and drinkers, who are constipated, lead sedentary lives and do not get exercise out of doors, do not clear up rapidly and completely after nasal sinus operations. An important factor is the factor of time: a patient who has had a nasal sinus operation should be warned that the opening of a sinus and the removal of the products of disease do not necessarily mean that there will be a sudden and definite cessation of nasal discharge. McGregor[3], of Toronto, has shown that when the mucous membrane has been removed from an infected nasal sinus it takes about six months to regenerate. Many cases of apparently persistent nasal discharge after operation clear up eventually without any further treatment. Indeed, such methods of treatment as daily nasal douches or the instillation of strong solutions of silver preparations may keep up the discharge instead of alleviating it. E. King[4] has proved that the use of strong solutions of silver nitrate in the maxillary antrum tends to produce long-continued inactivity of the cilia, with consequent susceptibility to colds.

CONSERVATIVE TREATMENT

While cases of long-standing nasal sinus suppuration will probably require surgical treatment, more recent cases and cases of catarrhal sinusitis should clear up with conservative methods. Some cases of nasal catarrh are due to hypothyroidism and improvement follows the use of thyroid extract, care being taken to begin with small doses. Many of the congestive states of the nasal mucous membrane are due to a toxic state originating in the colon and are cleared up by appropriate measures dealing with that condition. Many cases of persistent nasal discharge are allergic: Fig. 4 is a skiagram of a patient who appeared from that evidence to have an infection of both maxillary antra; they were punctured and washed out and found to be quite healthy, and on transillumination they were absolutely clear; it was

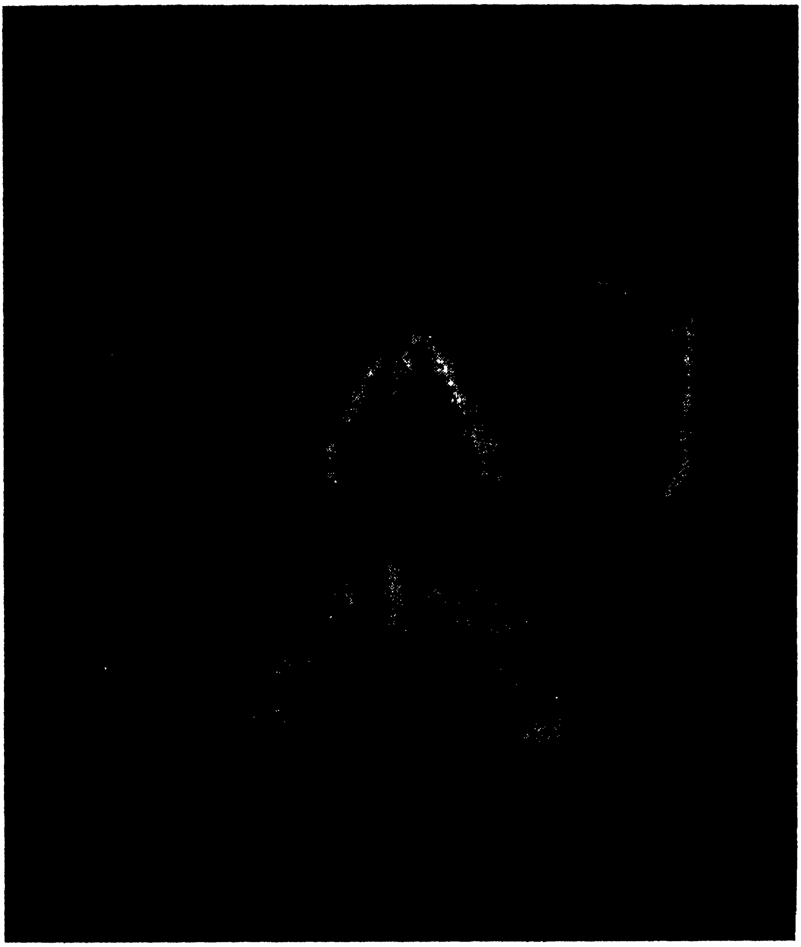

FIG. 4.—Skiagram of nasal sinuses apparently showing infection of both maxillary antra. It was found subsequently that the opacities of the antra were due only to temporarily swollen mucous membrane, the result of an attack of asthma.

ascertained that the patient had an attack of asthma when she was X-rayed. Such patients are treated like other allergic patients, by searching for and eliminating the offending substance or substances, by desensitizing injections, by large doses of glucose (two to four tablespoonfuls in lemonade, in the mornings, is sometimes successful), or by touching any sensitive spots in the nose, especially on the septum, with the dull red cautery (Francis's method) or with trichloracetic acid.

Many patients with persistent catarrhal sinusitis are found to have been using nasal douches, sometimes several times a day, for years. Such patients will improve almost at once by stopping the douches which undoubtedly keep the nasal mucosa in an unhealthy, soppy state, or even, when they contain antiseptics, keep it regularly irritated. Simple oily sprays or preferably drops are much better than watery douches. The following is a useful formula :—

℞	Ephedrine - - - - - -	0·75 per cent.
	Menthol - - - - - -	0·5 per cent.
	Camphor - - - - - -	0·5 per cent.
	Eucalyptol - - - - -	0·5 per cent.
	Liquid paraffin - - - - -	to 100 per cent.

A number of patients, especially those of an allergic type, are irritated by the ephedrine, although it is a valuable vasoconstrictor, and for them may be prescribed cajuput oil 5 per cent. in liquid paraffin, or the following :—

℞	Menthol - - - - - -	2½ grains
	Eucalyptol - - - - -	5 minims
	Liquid paraffin - - - - -	to 1 ounce

The most effective method of using the drops is for the patient to lie down, holding the head so far back that the chin and the auditory meatuses are in the same vertical plane, and then trickle the oily drops from a dropper down each nostril, using at least half the dropper full. It is important to get the drops into the middle meatus, for the frontal sinus, anterior ethmoidal sinuses and the maxillary sinus all open into the same small area under the middle turbinal (Fig. 5), and an infection of any of these sinuses will cause congestion of the mucosa of this area and so block the drainage of the other sinuses. To get the oily solution actually into the nasal sinuses it is necessary to employ the displacement method of Proetz[5], which can be carried out in a simple, modified form by keeping the head in the position described, closing one nostril with a finger of one hand and bringing about negative pressure through the other nostril with the aid of a bulb syringe held in the other hand, saying the letter "K, K, K" at the same time, which keeps the pharynx closed by lifting up the soft palate. It is not always necessary or desirable, however, to get the oil into the sinuses; what is most important is to de-congest the mucosa of the middle meatus and improve the drainage of the sinuses. Another method of bringing about this de-congestion is to pack a nasal tampon, of cotton wool soaked in 5 or 10 per cent. argyrol, into the middle meatus; a 1·0 or 1·5 per cent. solution of calcium chloride has likewise a beneficial action on œdematous mucous membrane. Such a tampon, however, must be accurately placed and this demands a certain knowledge of rhinology.

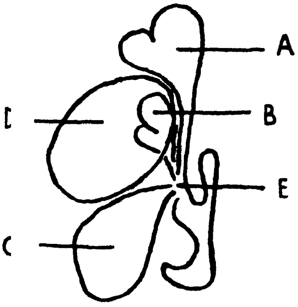

FIG. 5.—A, Frontal sinus. B, anterior ethmoidal sinuses. C, maxillary antrum. D, orbit. E, the small area under the middle turbinal into which the sinuses open (middle meatus).

Infra-red and ultra-violet rays have each been recommended for the treatment of nasal sinusitis. I have found infra-red heat more helpful in acute than in chronic cases, for it gives considerable relief to pain, but its continued use increases swelling and exudation from the mucous membrane. Having been at first rather scornful of the value of ultra-violet rays in sinus disease, I have to admit that in some cases of persistent nasal discharge after operation ultra-violet rays applied locally within the nose have proved undoubtedly helpful. Irradiation both by X-rays and radium has been employed in the past fairly widely for the treatment of sinus disease and is said to cause the shrinking of nasal polypi, but Fenton[6] and others have shown that it may have retarding or even destructive effects on the mucous membrane and walls of the sinuses.

The recovery of an infected nasal sinus depends on free drainage, proper aeration, and healthy ciliary action. J. F. O'Malley[7] has shown that the slightest changes in air pressure in the nasal passages are accompanied by alterations in the air pressure in the nasal sinuses, and physiological acts such as swallowing, coughing, sniffing and sneezing each caused a characteristic change in the recordings he obtained from the sinuses. The clinical importance of O'Malley's experimental work is that it proves the necessity for re-establishing the air currents between the nasal passages and the nasal sinuses. Whatever method of treatment may be considered necessary, whether conservative or surgical, should aim at the removal of the cause of disease, at the re-establishment of normal air-currents, and at giving every chance for ciliary activity to recover.

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SURGICAL ASPECTS OF CROUP IN CHILDHOOD

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ACCORDING to Stedman's Medical Dictionary croup is defined as " any affection of the larynx in children, accompanied by difficult and noisy respiration." In addition there is frequently a barking cough. When a child has these symptoms the mother brings him to the practitioner having already made a diagnosis of croup herself. Croup, however, is not a disease, but a symptom, and the practitioner must determine the underlying pathology. The conditions which give rise to croup are :—

Congenital laryngeal stridor; laryngismus stridulus; laryngitis stridulosa; acute laryngitis; diphtheritic laryngitis; retropharyngeal abscess; papilloma of the larynx; and a foreign body in the larynx, or upper trachea. Not all of these conditions have a surgical bearing so far as treatment is concerned, but each of them must be considered in making a diagnosis.

CONGENITAL LARYNGEAL STRIDOR

Inspiratory stridor in the new-born baby, or within the first few months of life, is usually the result of a congenital abnormality of the larynx, or perhaps more accurately of an exaggeration of the characteristics of the infantile larynx. Immediately after birth it is noticed that inspiration is accompanied by a croaking sound in the throat. There is no noise or obstruction during expiration, and the baby appears to suffer no inconvenience. Indeed, as is often the case, it is the mother who needs treatment, by reassurance, for not only is the noise worrying to her, but very irritating because of its continuance. The stridor is usually worse during the day, but may persist during sleep. While feeding, the baby can breathe adequately, a point of importance in differentiating the condition from congenital adenoids, which also cause noisy breathing, although not of laryngeal type or origin. The baby with adenoids has to stop sucking periodically to gasp for breath. The croaking is apt to increase during the first month or two of life, and thereafter to lessen gradually, perhaps to recur during excitement even into the second or third year. Such is the typical picture of congenital laryngeal stridor. Rarely the obstruction to inspiration is so great as to cause cyanosis, and even endanger life.

The underlying cause of the condition is to be found in the nature of the baby's larynx, possibly together with a lack of co-ordination of the respiratory muscles with those of the glottis. The larynx at birth is small, and the epiglottis is folded so that its lateral margins are approximated posteriorly. The ary-epiglottic folds are relatively and absolutely much closer together than in the adult, owing to this folding of the epiglottis. During inspiration these folds remain lax, perhaps from muscle inco-ordination, and are drawn together by the inspiratory blast of air, set in vibration, and produce the stridor.

Treatment is unnecessary as a rule. If there is cyanosis oxygen must be available, and it is conceivable that tracheotomy might be called for. Chevalier Jackson has seen three cases of congenital laryngeal stridor as a result of recurrent nerve injury during delivery. If the paralysis is bilateral tracheotomy must be performed.

LARYNGISMUS STRIDULUS

This condition, one of the manifestations of spasmophilia, has no surgical bearing, apart from diagnosis.

It occurs during the second year of life in children suffering from rickets. The glottis is closed for some seconds by spasm, and when this is released there is a crowing inspiration.

LARYNGITIS STRIDULOSA

Laryngeal spasm is apt to arise in children who are subject to upper respiratory infections, and laryngitis stridulosa is the name given to such spasm arising in a larynx already inflamed, often only slightly. The patient is usually a child under five years of age, who is subject to " colds " accompanied by barking cough and hoarseness. During the course of such an infection, and usually soon after being put to bed at night, the child in his sleep experiences difficulty in breathing. He wakes up struggling and terrified, gasping for breath, and the stridor indicates that the obstruction is laryngeal. The face becomes congested and later cyanosed, exhaustion increases, and, indeed, he appears to be in a parlous state. Then the spasm relaxes, and the breathing quickly returns to normal. The child falls into the sleep of exhaustion. The attack may be repeated the same night.

Faced suddenly with a child at the height of an attack of laryngitis stridulosa and without knowledge of the previous history, the practitioner would feel that a rapid tracheotomy was the only hope of saving life. Usually the circumstances are far otherwise, for the child has recovered from the attack and fallen to sleep before he arrives. With knowledge of the patient's disposition and the history of the rapid recovery from the attack, the diagnosis will not be difficult. He must be on his guard against laryngeal diphtheria. The onset would be more gradual, and the element of spasm not so marked. The child would have been ill for several days, and the respiratory obstruction would not have vanished completely, leaving a sleeping child with a good pulse. Examination of the throat would show diphtheritic membrane on the fauces or in the larynx. Direct laryngoscopy must be performed in any case of doubt.

The *treatment* of an acute attack is to plunge the child into a hot bath, or a hot sponge should be applied to the neck. The spasm reacts rapidly to such measures. An adequate dose of potassium bromide should be administered as soon as the attack has eased, to prevent recurrence that night. Active treatment of the upper respiratory infection must be undertaken. This will usefully include inhalations of tinct. benzoin. co., and instillation of mild antiseptic drops to the nose, such as menthol 0·5, eucalyptol 0·5, oil of cinnamon 0·75, in 100 of liquid paraffin. Finally a search must be made for any focus of infection which may make the child liable to nasopharyngeal inflammation. The tonsils and adenoids are most often to blame, and there are many instances in which their removal has been followed by cessation of this type of croup. It must not be forgotten that a common cause of pharyngeal sepsis in childhood is the infection of one of the nasal accessory sinuses. An X-ray examination will confirm or exclude such a possibility.

ACUTE LARYNGITIS

Acute upper respiratory infection may spread until there is involvement of the larynx. The infecting organism is usually a streptococcus, and if it is very virulent a false membrane may form in the throat, and in the larynx. Such a condition is not common, but when it does occur there is danger of respiratory obstruction owing to the small size of the child's larynx. Even if no membrane forms, sub-glottic œdema is readily produced in the lax tissues of the young. Noisy and difficult respiration, croupy cough and loss of voice occur, and super-added spasm may lead to acute asphyxia. The condition closely resembles laryngeal diphtheria. Differential diagnosis will only be established by the exclusion of the Klebs-Loeffler bacillus, although the absence of membrane in those cases in which it does not form, and the high fever, may lead one to suspect the true nature of the inflammation. The value of direct laryngoscopy is obvious.

Treatment will consist of steam inhalations, impregnated with tinct. benzoin. co. Hot fomentations to the neck are helpful. In severe cases one must be prepared for tracheotomy. Until the diagnosis is established otherwise diphtheritic infection must be assumed, and antitoxin given in adequate doses.

DIPHTHERIC LARYNGITIS (TRUE CROUP)

Diphtheritic membrane may form in the fauces, and spread to the larynx, or it may be present in the larynx alone. The term " true croup " is applied to diphtheritic laryngitis. The symptoms are those of diphtheria with laryngeal obstruction in addition. The child is ill and pale, with a significant bluish tinge of the cheeks and lips. The breathing is noisy, and there is indrawing of the intercostal spaces and upper abdomen, indicating the degree of respiratory obstruction. Spasm of the larynx will aggravate symptoms. The cervical glands are enlarged. Examination of the throat may show membrane on the fauces. In its absence it is essential to examine the larynx with the direct laryngoscope. No anæsthetic is necessary or advisable.

Treatment is that of diphtheria. Swabs should be taken, but the injection of antitoxin must not wait upon their examination. The child is propped up in bed, and the air is impregnated with steam from several kettles. A tent should not be used as it adds an element of stuffiness which is to be avoided. A soothing expectorant mixture should be given, such as :—

Tinct. camph. co.	2 minims.
Syrup. scillæ	7 minims.
Spt. nitrous ether	2 minims.
Glycerin.	5 minims.
Aquamad	60 minims.

for each year of age. Preparation must be made for intubation of the larynx or tracheotomy. Experience will lead one to resort to either only as a life-saving measure.

Intubation and tracheotomy.—Intubation avoids a cutting operation, ensures respiration through the normal channels, and is readily and rapidly performed by the expert. It has the serious drawbacks that it requires much practice, and that the tube may be coughed out at any time. It is therefore necessary for the doctor to be available at all times. A child will die in twenty minutes or so after coughing up the tube; it takes that time for the passage left open by the tube to close up. Tracheotomy is therefore the method of choice, except in special institutions. Textbooks have emphasized that there are two types of tracheotomy operation—the high and the low. This differentiation was made in reference to and in reverence of, the isthmus of the thyroid gland, and it has done much harm. There is only one type of tracheotomy to be considered, and that is as low as possible, and with adequate exposure of the trachea. High tracheotomy may damage the larynx or lead to stenosis of the trachea at a later date by injury to the cricoid. The isthmus of the thyroid gland is of no importance as compared with these accidents or with the adequate and rapid opening of the trachea.

The child is placed on his back on a table with a pillow under the shoulders. The body and head must be straight. If the condition of the patient demands speed no anæsthetic need be used. Otherwise 2 per cent. novocaine is injected under the skin. The incision is from the prominence of the thyroid cartilage, down to the suprasternal notch. The soft tissues are separated in the middle line by blunt dissection or dissecting scissors. The isthmus of the thyroid gland is pulled upwards or divided. The knife is used to divide the second, third and fourth rings of the trachea. A trachea dilator is inserted, and followed by the tube. If there is no hurry the operation is performed deliberately and in stages, and bleeding points are caught as they appear. When there is need of hurry the sense of touch must replace that of sight, for there is too much blood for vision, and the forefinger of the left hand feels for the rings of the trachea.

Faced with an emergency tracheotomy there is no need for the practitioner to try to recall hazy memories of anatomy. He must keep the body and head of the patient straight, and his incisions must be in the mid-line. The incision into the trachea must be as low down as he can conveniently make it.

RETROPHARYNGEAL ABSCESS

If a strict interpretation of the definition of croup were considered retropharyngeal abscess would not be mentioned here, for it is not primarily a disease of the larynx. However it gives rise to signs and symptoms which are generally recognized as croup, for it presses on the larynx.

Acute retropharyngeal abscess.—The acute abscess develops in a young child who has recently suffered from an upper respiratory infection. Apart from the frequency of such infections in November, there does not appear to be a satisfactory explanation why the majority of these abscesses occur in that month, but this is an observed fact both in London and in Boston, U.S.A. The child, usually under one year of age, breathes noisily and with difficulty; there is croupy cough. If the head is allowed to fall backwards the respiratory obstruction is increased. The child is ill and worried, and pallor is often tinged with cyanosis. The neck may be held stiffly, and the cervical glands are enlarged. There may or may not be fever. On examination of the throat the posterior pharyngeal wall is seen to bulge forward, usually more to one side of the middle line than the other. If a good view is obtained it is unnecessary to confirm the diagnosis by palpation, but this manœuvre will be useful in determining if fluctuation is present. The glandular swelling which precedes the formation of pus is not suitable for incision. A warning must be given regarding digital examination in large retropharyngeal abscesses with obstruction; it may give rise to spasm and fatal asphyxia. If such a catastrophe seems imminent the baby must be held up by the legs and the abscess ruptured by the finger nail or by sinus forceps. Pus gushes out of the nose and mouth, and recovery is immediate. This type of abscess is the result of infection of the glands which lie on either side between the posterior wall of the pharynx and the pre-vertebral fascia. The bacteria reach them from the deep cervical lymph glands, which have been infected from the pharynx. Since the retropharyngeal lymph glands atrophy at an early age, abscess formation occurs only in young children, and usually in babies.

Treatment is incision of the abscess. If there is much difficulty in respiration it is wise to avoid an anæsthetic altogether. Have the child held firmly with the head in a dependent position, gag open the mouth, and force a closed pair of sinus forceps through the soft abscess wall. Open the forceps slowly, and the pus which wells forth will be coughed out. Improvement is immediate. If the abscess is not giving rise to respiratory difficulty a general anæsthetic (open ether) may be given. A sandbag is placed under the shoulders of the child, and the head is fully extended. The mouth is gagged open, and a sucker is placed in the back of the throat. The abscess is opened by a guarded knife, the first incision being very small, so that there is not a gush of pus. The incision is enlarged with sinus forceps. Recovery of these patients is usually uneventful, but any focus of nasopharyngeal infection must be eradicated.

Chronic retropharyngeal abscess.—Tuberculous infection of the cervical lymphatic glands may spread to the retropharyngeal glands, and it follows that a cold abscess may form behind the pharynx. The abscess should be drained as part of the operation for the neck condition, and not through the mouth. Tuberculous cervical spinal caries may result in a retropharyngeal abscess, which, like the other form of cold abscess, must not be drained through the mouth.

PAPILLOMA OF THE LARYNX

Papilloma of the larynx is not uncommon in children, and it has repeatedly been found in children who have been labelled as croup over a period of months, without any real attempt having been made to discover the cause.

I found multiple papillomas in the larynx of a boy three years of age. He had had his tonsils and adenoids removed six weeks previously for croup, naturally without improvement. He was a typical example of the condition. He had been hoarse for six months, and had had a barking cough for the latter half of that time. On exertion there were attacks of breathlessness with stridor, but even in repose the breathing was noisy. The symptoms were getting progressively worse.

Diagnosis is made by the direct laryngoscope. The papillomas are often pedunculated, and consist of a mass of filiform processes. They grow from the vocal cords as a rule, but may arise in the trachea, or from the epiglottis. They are often multiple. Papilloma is an innocent tumour, with a marked tendency to recurrence in the larynx, either at the site of removal or elsewhere.

Treatment is removal with sharp-edged scoop forceps, great care being taken not to injure the underlying normal tissues. Such encroachment on the normal structures will not prevent recurrence, and permanent damage will be done to the larynx. The process is repeated whenever necessary, that is as often as respiratory obstruction develops. Ultimately, perhaps after many years, the papillomas cease to reappear. More radical removal should not be attempted. Radium has been applied to the larynx for its effect on papilloma, but it must be carefully screened to prevent necrosis of cartilage.

FOREIGN BODY IN THE LARYNX

The sudden onset of respiratory obstruction and stridor in a child should arouse suspicion of foreign body in the larynx. The entrance of the object is heralded by a very violent fit of coughing. Rounded, smooth, foreign bodies are more likely to fall into a bronchus or be coughed up than to stick in the larynx. Pins, fishbones, and other small pointed objects are likely to lodge in the larynx.

The diagnosis is made from the sudden onset of the symptoms, and possibly from the history. It is confirmed by X-ray if the foreign body is radio-opaque. It is established by the direct laryngoscope, and removal is effected forthwith.

CONCLUSION

The pathology underlying croup may range from mild pharyngitis and laryngitis following a cold, or dependent upon infection of the tonsils and adenoids, to such dangerous and urgent conditions as foreign body in the larynx or laryngeal diphtheria. Respiratory difficulty is a warning which must not be disregarded. It may increase so rapidly as a result of superadded spasm of the larynx that when it is present the practitioner must not rest until he has been able to arrive at a diagnosis. In doubt, inspection of the larynx by the direct laryngoscope is essential.

A REVIEW OF RECENT PROGRESS IN THE CHEMOTHERAPY OF SEPTICÆMIA

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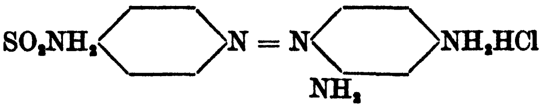
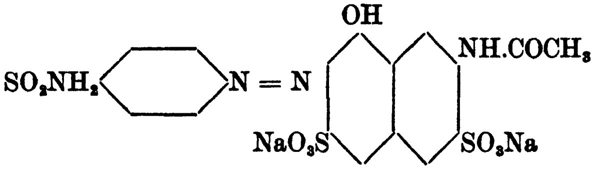
A PERUSAL of standard works, such as Fränkel's *Die Arzneimittel–Synthese*, reveals that many different lines have been followed in the chemotherapy of streptococcal and other infections, and a vast amount of work has been done in trying to find a chemical substance capable of combating the streptococcus in the same way that salvarsan deals with the causative organism of syphilis. It is not proposed to review this extensive literature since it can be stated with little fear of contradiction that, until recently, no compounds were prepared that were really effective and could be used with clinical success. For example, the striking results obtained in certain animal experiments with the various cuprein derivatives by Morgenroth and his colleagues, could not be applied clinically owing to the toxicity of the compounds.

It was not until the year 1935 that Domagk published a startling statement that a chemical substance had been prepared capable of protecting mice against infection with virulent hæmolytic streptococci. The substance was a red dye, namely, 4′-sulphamido-2 : 4-diaminoazobenzol in the form of its hydrochloride. This was known as *Prontosil* and was administered to animals by the mouth. It was thus possible to show that, although only slightly soluble in water, the compound was readily absorbed and would protect mice against streptococcal infections produced by inoculating virulent strains subcutaneously. It is to be noticed that the compound is only slightly soluble in water and has a low toxicity. The water-soluble form *Prontosil soluble,* formerly known as *Streptozon S,* has been used for subcutaneous injection. The formulæ for the two compounds are as follows:

Prontosil



Prontosil soluble



Already a considerable literature has grown up indicating the use of these compounds. The following table gives a summary of some of the recent German literature (Table I). In England, an interesting and full paper will be found by Colebrook and Kenny in the *Lancet.* These authors conclude that the compound is of great value in the treatment of streptococcal infections, and in their paper describe the clinical details of a number of cases treated. They summarize their views on the treatment of puerperal fever in the following statement—

> "Subject to confirmation by further experience the impression has been gained that in many of the more severe cases the drug has exerted a definitely beneficial effect, manifested by unexpectedly prompt fall of temperature and remission of symptoms; and this impression is supported by a substantial reduction in the case-mortality of the whole series."

In France work of a similar nature to that of Domagk and his collaborators has been undertaken by Levaditi and Vaisman (1935). The material used by these workers was synthesized by Girard which may possibly have a different composition from that

TABLE 1. *Prontosil* (Bayer)

Author.	Reference.	Condition Treated.	Result.
Anselm, E.	Deut. med. Woch. 1935, lxi, 264.	Puerperal fever	Good.
Bingold, K.	Münch. med. Woch. 1935, lxxxii, 871.	Hodgkin's disease	(?) Good.
Domagk, G.	Deut. med. Woch. 1935, lxi, 250.	Sepsis	Good.
Einhauser	Med. Klin, 1935, xxxi, 1220.	Sepsis and erysipelas	Good.
Frank	Med. Klin. 1935, xxxi, 1378.	Pyuria	Good.
Fuge, K.	Deut. med. Woch. 1935, lxi, 1672.	Puerperal fever	Doubtful.
Gmelin, L.	Münch. med. Woch. 1935, lxxxii, 221.	Streptococcal septicæmia Erysipelas.	Good.
Hörlein, H.	Lancet, 1935, ii, 840.	General	Good.
Imhäuser, K.	Med. Klin. 1935, xxxi, 282.	Sepsis	Good.
		Meningitis Endocarditis	None.
Klee & Romer	Deut. med. Woch. 1935, lxi, 253.	Sepsis	Good.
Kramer, W.	Münch. med. Woch. 1935, lxxxiii, 608.	Streptococcal infections.	Very good.
Lampert	Zentr. f. Chir. 1935, 2947.	Erysipelas	Good.
Recknagel, K.	Münch. med. Woch. 1935, lxxxii, 704.	Various infections	Favourable.
Roth, A.	Deut. med. Woch. 1935, lxi, 1734.	Sepsis	Good.
Scherber, G.	Wien. med. Woch. 1935, lxxxv, 284, 346, and 376.	Erysipelas	Good.
Schranz, H.	Münch. med. Woch. 1935, lxxxii, 419.	Puerperal sepsis Osteomyelitis Boils	Good.
Schreus, H. T.	Deut. med. Woch. 1935, lxi, 255.	Erysipelas	Good.

of the German material; it is known by the name of *Rubiazol* (Roussel). Extensive clinical reports have appeared in the French literature, and the following table provides a brief summary of the papers to date (Table 2).

MODE OF ACTION

Many attempts have been made to determine the mode of action of these compounds. It must be understood that they are inactive *in vitro* and that their action is probably similar to that of salvarsan, namely, that the drug acts in some way through the

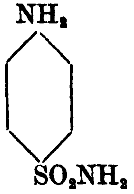
TABLE 2. *Rubiazol* (Roussel)

Author.	Reference.	Condition Treated.	Result.
Causse	Presse méd. 1935, Sept. 11.	Purulent meningitis	Good.
Chambon & Sollier.	Soc. de méd. de Nimes 1936, Feb. 4.	Septicæmia Hæmolytic streptococcal infection.	Good. Good.
Huguenin	*A thesis published in Paris, 1935.	Erysipelas	Good.
Lacomme	Bull. de la Soc. obst. et de gynéc. 1935, 443.	Post-partum infection	Good.
Le Jemtel	Mém. de l'Acad. de Chir. 1936, lxii, 12.	Boils	Good.
Levaditi	Bull. de l'Acad. des Sci. 1935, May 13.	Streptococcal infection.	Good.
Levaditi & Vaisman.	Compt. rend. Soc. de biol. 1935, cxix, 946.	,, ,, ,,	Good.
Levaditi & Vaisman.	Compt. rend. de l'Acad. des Sci. 1935, cc, 1694.	Hæmolytic streptococcus in mice.	Good.
Nitti and Bovet	Compt. rend. Soc. de Biol. 1935, cxix, 1277.	,, ,, ,,	Good.
Sollier	Soc. de méd. de Nimes 1936, Feb. 4.	Streptococcal septicæmia.	Good.
Tixier & Eck	Bull. de la Soc. de péd. 1935, 493.	Streptococcal pleuresy.	Good.
Worms & Daum	Bull. gén. de Thérap. 1935, 289.	Erysipelas	Good.

* "Traitement de l'Erysipèle par le Chlorhydrate de Sulfamido Chrysoïdine." Paris. 1935.

action of the body. A great deal of work has been done in order to determine the molecular structure necessary for activity. The azo dyes generally are antiseptic *in vitro*, and it was shown by Hörlein (1936) that the introduction of a sulphonamide group reduced considerably the *in vitro* antiseptic properties, but would not affect the power of protection on infected mice. It was this observation that led to the original discovery of prontosil. It appears, therefore, that the prontosil-like structure is necessary for activity.

An interesting paper by Trefouel, Nitti and Bovet (1935) produced definite evidence which pointed to the fact that the body broke down the complex prontosil molecule by severing it between the two nitrogen atoms with the formation of *p*-aminobenzenesulphonamide. They were able to show that this substance was capable of protecting mice in a precisely similar manner to prontosil. This was further confirmed by Goissedet, Despois, Gaillot and Mayer (1936). These findings were also confirmed in England by Buttle, Gray and Stephenson (1936). The toxicity of this compound appears to be considerably less than that of prontosil, and the curative activity seems to be at least as good as, if not better than prontosil. A detailed paper on the activity of various derivatives and substances related to *p*-aminobenzenesulphonamide has been published by Fourneau, Trefouel, Nitti and Bovet (1936). Their conclusions are as follows:



> That alteration of the amino group to either the *ortho* or *meta* position results in loss of activity. Replacement of the sulphonamide group by other groups also results in loss of activity. Their final conclusions are that the *p*-aminobenzenesulphonamide is the most active.

Clinically this material has been employed in France in doses of 4 to 5 gm. per day to persons weighing about 75 kgm. It was reported to act extremely rapidly and has been used in the treatment of erysipelas and various forms of streptococcal septicæmia. Treatment must continue for a considerable time since recurrences are likely to occur if the administration of the drug is stopped at the first abatement of symptoms.

p-Aminobenzenesulphonamide (Crookes) has been tested on a number of patients in this country and results have been obtained in confirmation of the continental literature. Thus, with doses of up to 5 gm. per day it has been possible to reduce the temperature in erysipelas in a manner similar to that obtained with the use of prontosil. Cases of septicæmia also responded to treatment with this material.*

Further clinical experimentation with these compounds will be awaited with the very greatest interest. The work of the chemotherapists referred to above has provided a whole new series of substances for the clinician to employ, although, of course, it may be some time before the most active compound of the group can be selected. One of the great advantages of this series appears to be their comparative lack of toxicity and the fact that they can also be given by mouth.

The enthusiasm for this group of compounds in Germany and France is little short of astonishing. For example, in many hospitals on the continent doses of this substance are given by mouth to every parturient woman as a prophylactic against puerperal sepsis. The compounds are also being used extensively in veterinary work and according to personal reports they appear to be justifying their employment.

It is obvious from the brief summary that has been given above that a great deal of work will have to be done to investigate the mode of action and the chemical constitution associated with the maximum degree of activity. The whole field is one of the most fascinating that has been presented for some considerable time alike to the clinician, the chemist, and the bacteriologist.

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*p–Aminobenzinesulphonamide is already on the market under the name of "Prontosil album" (Bayer).

HEART DISEASE AND OCCUPATION

BY R. O. MOON, D.M., F.R.C.P.

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ONE of the most important problems which confronts the physician in regard to diseases of the heart is how to give sound advice as to occupation. In former days the very expression "heart disease" seemed fraught with terrible consequences. Not only was there the fear of sudden death, but also apart from this, a life of prolonged invalidism—no serious work for men, a life on the sofa for women. Of late years the long continued and accurate note-recording of cases together with the modern mechanism of X-ray and electrocardiographic examinations have changed all this. It is now known that sudden death, apart from angina pectoris, coronary thrombosis and aortic disease is quite unusual. It is now more generally recognized that though, of course, seriously heavy work, such as has to be performed by the soldier, sailor, airman, navvy and dock labourer, is out of the question for those affected with any form of cardiac disease, there are yet quite a number of occupations, not necessarily all sedentary, which may very well be engaged in by such patients.

Clearly in everything connected with occupation of any kind for those who have heart disease, prognosis is the essence of the matter. Now it is this which mainly concerns insurance companies, but for them the only thing to be considered is how long the proposer is likely to live, and the benefit of the doubt has to be given to the shareholders. But the physician is concerned not merely with the length of the patient's life, but with the more profound question, in what way a man can live with greatest profit to himself and the community? In what work can he most effectively engage or continue? Are there some trades which are more suitable for cases with heart disease than others? Though nowadays less stress is laid upon the importance of valvular disease than was the case a generation ago, it certainly cannot be left out of the picture.

The amount of work which can be safely undertaken by patients with aortic disease differs strikingly from that which can be done by those with a mitral lesion. In mitral stenosis the heart is never capable of great exertion, as has been said by a French physician " le cœur est réglé pour un petit travail," still it is compatible with a reasonably long life and occurring as it usually does in the case of women, does not constitute an obstacle to marriage, pregnancy and childbirth. But in women it is more difficult to organize work, because of the multifarious activities of the home, and they might well say with Frau von Stein, in a letter to Geothe: " It is not perceived that to discharge the thousand little details of life, which we have to attend to, more ability (for which we get no credit) is required than for the doings of a genius who is at once accorded honour and fame." In the humbler classes it is an important point to insist upon the omission of washing clothes, which involves more exertion than might appear.

In aortic disease, however, the possibilities of occupation are markedly greater. But here there is a very great difference between the aortic disease due to rheumatic fever or chorea on the one hand, and that which is caused by lues and associated with arterial degeneration on the other. In the latter condition the disease is progressive, though it may be but slowly. When the lesion is due to rheumatism, provided there are no second attacks, it is relatively static and is somewhat analogous to infantile paralysis in which, after a time, the child is left with some muscles definitely paralysed, but can still get about very fairly well; it suffers from a handicap rather than a disease; similarly cardiac disability or laming of the heart would be a better expression for these cases than disease of the heart. Thus in aortic disease of rheumatic origin a considerable amount of exertion may often be permitted. Such patients may do relatively hard work not only without risk, but even with advantage, for the heart, like other muscles, is *ceteris paribus*, benefited by exercise. This is the kind of case reported as having played football strenuously or engaged in some other violent exertion. Needless to say that such excessive exercise is quite unsound, but, no doubt, more work can safely be undertaken by such patients than is usually imagined.

But it is now realized more and more that the occupation which a man may safely undertake, depends far more on the myocardium—the strength and weakness of the heart muscle—than upon anything else. William Stokes of Dublin, nearly a hundred years ago, was aware of this when he said "It is in the vital and anatomical condition of the muscular fibres that we find the way to cardiac pathology; for no matter what the affection may be, its symptoms mainly depend on the strength or the weakness, the irritability or the paralysis, the anatomical health or disease of the cardiac muscle." Unfortunately there are no precise means of determining the strength of the myocardium. True, indeed, an electrocardiographic tracing which shows an inverted T wave in leads I or II does indicate some deterioration of the heart-muscle, but not the degree of that deterioration so that it is necessary to depend largely on the patient's symptoms in recommending his course of life.

ADVICE TO BE GIVEN

In offering advice to a patient with heart disease as regards work, the following considerations should be borne in mind:—

(1) Occupations should be avoided which involve

sudden spurts with unduly slack intervals of rest.

(2) It is advisable to inquire whether in any given occupation the hours are regular and the work more or less the same from day to day and hour to hour. It is important to consider the regularity of the work as the amount of energy which has to be expended on the work itself.

(3) Consider what a man has been accustomed to do rather than the number of foot pounds of energy which he has to devote to his work. Many a man who has for a long time been at work in some comparatively heavy trade, has acquired the knack of so economizing his energy that he may be able to continue at his work in spite of his cardiac disability.

(4) Work which places a fairly heavy strain on the lower extremities is much more easily tolerated than that in which the main strain falls upon the arms. Most forms of aortic disease, particularly those of the degenerative type, seem to be very unfavourably affected by any work, such as carpentering, which puts any strain upon the upper limbs. I remember a case of a young woman with congenital pulmonary stenosis who could take a fair amount of exercise, but playing the piano was too much for her.

(5) Some occupations, such as portmanteau sewing, which may in themselves be quite suitable, often involve incidentally some heavy lifting. Thus a man is suddenly asked to move about a heavy box or trunk and it is this which does the damage and not the work itself.

(6) Aortic patients even when doing fairly well are often liable to transient attacks of giddiness, which would rule out many occupations in the building trade, such as involve going up ladders or coming in close contact with machinery.

(7) It is well to inquire into the kind of journey which a man has to take on his way to his work.

Often it is not the work itself which is particularly harmful, but the exertion expended in the endeavour to catch train, tram or omnibus, or the long walk uphill after the day's work is finished.

For several years I saw at intervals a bank clerk with aortic disease of specific origin and occasionally slight anginiform attacks. In spite of having to stand all day in the bank and often having to move heavy bags of coin, he got on very well at the work, only feeling distressed by the morning journey to the bank.

Again it makes a good deal of difference if at the end of a day's work a man has to ascend to the top of some model dwelling instead of living in a two-storied cottage.

(8) Avoid as a general rule dusty occupations, at least for mitral cases, as they induce coughs and catarrhs, so favouring bronchial congestion to which these patients are particularly disposed.

(9) Avoid occupations which are likely to involve much anxiety or emotional disturbance.

In advising about occupations generally it is important to consider whether they expose the patient to sudden changes of temperature and vicissitudes of weather. For any given patient much must depend on a man's education, previous training, general mental equipment and temperament. It is, of course, important that a man should work well within the limit of his capacity so that there should be a margin of safety.

LIGHT WORK

The following occupations are usually classed as " light work " and are fairly suitable for those with unprogressive valvular disease.

(1) *Tailoring.*—This work is in general light enough, the only really heavy part being the ironing. The iron usually weighs from 14 to 20 lb. and may even weigh as much as 30 lb. Doubtless, there is much knack in the use of the iron, so that the weight may not seem much to a man accustomed to the trade. As a rule tailoring is usually associated with badly

ventilated rooms, but, of course, there is no reason why the ventilation should be bad, and of late years all workshops have improved in this respect.

(2) *Boot-making* is classed as "light work" and so in a general way it is, but it will often be found ill-suited for many forms of heart disease, as it involves much use of the arms both in hammering and wide stitching, which nearly always puts a strain upon the heart. The posture, too, of boot-makers is not exactly favourable for any form of chest complaint.

(3) *Boot-repairing* is also classed as "light work," but here again the ordinary boot repairing known as "botching," as opposed to the finer form of boot "repairing," involves standing upright at the bench for long hours at a stretch, which puts a considerable strain upon the circulation. On several occasions I have found men with compensated aortic lesions who have had to give up this sort of work owing to the long hours of standing required, though they might have done intrinsically harder work which did not involve so much standing.

(4) *Basket-making* is eminently suitable for those suffering from many affections of the heart, but this is not always so, for there is a great variety in basket-making in different localities, and the making of a large basket often involves a wide extension of the arms and so puts an undue strain upon the heart.

(5) *Leather work.*—Many kinds of this work are well adapted for most forms of cardiac disease, when the patient can get about easily, but for this occupation a man should be fairly handy and intelligent.

(6) *Scavenging* for a borough council, which mainly involves sweeping, is quite a suitable occupation in an ordinary way. Unfortunately "squeegeeing," which has to be done when it has been specially wet, often unfits them for the job.

(7) *Painting* may be a suitable occupation, but then it must be remembered that aortic cases are liable to

attacks of giddiness, which rules out the ascending of ladders and going on scaffolding, which are just the things a painter may be expected to do. If work can be obtained which is always on the ground floor such as motor-car painting, or painting the railings round Hyde Park or other such parks, nothing could be better.

(8) *The Civil Service.*—Government departments are apt to turn down applicants with any form of heart disease. This is surely rather a mechanical way of regarding things. Without taking the paradoxical view that some forms of heart disease might be a qualification for the civil service, yet the regularity of that form of work, together with its comparative freedom from anxiety, at all events in the lower ranks, should render it particularly suitable work for many patients with cardiac disease. Nor is there any more reason to expect in such cases breakdowns in health and times off than would be the case in a patient suffering from various neuropathic conditions, the diagnosis of which is usually less obvious. Even looked at from the financial point of view, since the expectation of life in a cardiac case is definitely somewhat less than that of a normally healthy person, the period for the payment of pension after retirement would be clearly curtailed.

It is the natural instinct of the physician when confronted with a cardiac case to recommend clerical and sedentary work only, and unhappily, but too often this is all the advice which can be safely given. But among the large numbers of manual labourers there are many whose whole temperamental and psychic make-up, so to speak, is entirely unsuited to sedentary work and for these it is important to be able to suggest at times something more active. The whole aim of industrial or occupational medicine is to find the square hole for the square man. In the United States much has been done for the relief of heart disease by starting trade schools for cardiac convalescents, which act as training centres for occupation with an occupational bureau.

Apart from the graver structural lesions of the heart, there are all kinds of minor cardiac affections which, for want of a better name, might be grouped under the heading of "weak hearts." These cases may in some instances be the result of an infective process such as influenza, malaria or, indeed, any febrile condition and may not unreasonably be called "poisoned hearts." But in addition to this there would appear to be some people who have been born apparently with subnormal cardiac efficiency; fortunately such cases have for the most part drifted into quasi-sedentary occupations, more or less suited to them, as they have instinctively realized at the outset of life an inaptitude for much physical exertion without being clearly conscious of having any definite heart weakness.

When the heart has been damaged in childhood it must always be a source of anxiety, and one is often asked in the case of a boy what he may be able to do in the future. Here it is well to be cautious, for there is always the likelihood of further attacks of rheumatic fever, which may inflict additional damage on the heart. Then there is the trying time of puberty from which the heart may emerge in a weakened condition, so that in childhood it is seldom wise to hold out hopes of more than a sedentary occupation and to have a boy trained early with that in view. Should he have an aptitude for drawing there are always possibilities in an architect's or engineer's office. When once puberty is past, the cardiac lesions of rheumatic origin which occur in early adult life have a much more favourable outlook altogether, and it is for these in particular that the more active forms of work will be found possible.

TUMOURS OF THE APPENDIX

BY CECIL P. G. WAKELEY, D.Sc., F.R.C.S., F.R.S.E.

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TUMOURS of the appendix were almost unknown fifty years ago, and yet, to-day, they form a definite and well-recognized pathological entity, and there are records in literature of over five hundred cases. There can be no doubt that quite a number of cases of tumours of the appendix are definitely related to old inflammatory lesions. If every appendix which was removed surgically was examined histologically, there would be a large increase in the number of tumours found. At the present time it is difficult to estimate with any degree of accuracy the percentage of such tumours, but it may be put down at about 0·4 per cent. There are only two types of tumour found. One is a true carcinoma which is rare and behaves like a carcinoma of the bowel and forms metastases which cause death of the patient. The other, which is much more common, is a carcinoid tumour. These tumours are usually situated towards the free extremity of the appendix, quite often forming a rounded bulbous tip to the appendix. In some cases, however, they are to be found near the base of the appendix when they have a tendency to cause diverticula of the appendix and, at times, even acute appendicular obstruction. These carcinoid growths present an alveolar structure which is quite like a cancer, and they may be so minute that they cannot be seen by the naked eye and are only discovered accidently on microscopical examination. The cells of these carcinoid tumours are somewhat small, arranged in irregular masses in the submucous coat, and extending in places into the other coats of the appendix. There are in the cells, minute granules which have the power of reducing silver salts and hence they are called " argentaffine " cells. It is because of this that some pathologists have called such tumours of the appendix " argentaffine tumours," but such terminology is redundant and serves no useful purpose. It is most uncommon for metastases to occur, but several authentic cases have been recorded. It is because of this that every appendix which is removed should be submitted to microscopical examination. At the present time probably less than twenty per cent. of appendices that are removed are examined pathologically.

Carcinoid tumours are also found in the intestines, but they differ in one important respect, namely, they are usually multiple. These intestinal carcinoids have been discovered at post-mortem examinations, the patients having died from other causes. It is interesting to note that the name " carcinoid tumour " was suggested by Oberndorpfer in 1907. He showed that these tumours might occur in any part of the alimentary tract, from the cardiac end of the stomach to the anus. Krompecher suggested that the tumours were of similar nature to basal-celled carcinomas of the skin, emphasizing the palisade-like arrangement of the cells bordering each clump of cells. The absence of metastases in the earlier cases supported this view by giving a further point of similarity to the basal cell carcinomas. However, it has been proved that some of these cases are malignant, but in many of the earlier cases no metastases had occurred at the time of death. Zachary Cope reported a case of carcinoid tumour of the ileum with numerous secondary deposits in the peritoneum and in the left testicle. He also gave a list of cases of carcinoid tumours of the small intestine which had metastasized. Just in the same way as carcinoid tumours of the appendix may give rise to symptoms of acute or chronic inflammation, so these similar tumours in the small intestine may give rise to acute intestinal obstruction and call for immediate operation. Primrose recorded a case in an octogenarian who was operated upon for acute intestinal obstruction caused by a carcinoid tumour of the ileum.

Carcinoid tumours of the appendix are peculiarly innocent, so much so that continental writers have questioned whether or not they should be called by any name which even suggests carcinoma. Aschoff, for example, considers that these tumours closely resemble the epithelial formations seen in cutaneous nævi and has suggested the name "mucous membrane nævi." It is quite probable that these tumours cause clinical symptoms which in themselves call for appendicectomy before any spread outside the appendix can occur and, therefore, they are looked upon as benign, or carcinoid in type. As long as the medical profession is in agreement that an inflamed appendix should be treated by surgical removal, there does not seem to be any risk of spread of these tumours outside the wall of the appendix. It must be said that quite a few of the recorded cases in the literature have been found accidentally, in the examination of chronic appendices removed at operation or at post-mortem. On the other hand, Sir David Wilkie reported three cases in 1921, all of which were causing diverticula of the appendix and acute appendicular obstruction. During the last twenty years I have removed carcinoid tumours of the appendix in six cases. In none of these was a diagnosis other than appendicitis made, and I do not think that any definite characteristic symptomatology can ever be made out in these cases. It is curious that the vast majority of cases are confined to young females and not in aged individuals.

CLINICAL RECORDS

The following is a short account of my six cases :—

Case 1.—Female, aged 21, was admitted to hospital in February, 1915, complaining of acute abdominal pain of some ten hours' duration. She was always constipated and often had her bowels moved only twice a week. She was in the habit of taking liver pills once a week. The abdominal pain commenced quite suddenly at 7.30 a.m., while she was having some ham and eggs for breakfast. She went to her work at an office, where she was a typist, having taken several doses of peppermint water. The abdominal pain gradually became more severe and at 11 a.m. she vomited twice. She was sent home in a taxi and went to bed, and for some hours felt much better. However, about 5 p.m. she vomited again and the pain became localized in the right iliac fossa. She was transferred to hospital. On admission her temperature was 100° F, pulse 94, and respirations 20. She complained of pain in the right iliac fossa, and nausea. Examination revealed tenderness in the right iliac fossa but nothing else. The diagnosis of acute appendicitis was made and operation decided upon. Under open ether anæsthesia, a gridiron incision was made in the right iliac fossa. On opening the abdomen the appendix was found in the retro-cæcal fossa, it was thickened, congested, and had a bulbous extremity. Appendicectomy was performed and the wound closed without drainage. The patient made a rapid recovery and was discharged on the twelfth day after operation.

On cutting the appendix the lumen was congested and contained two concretions. At the distal end was found a solid rounded tumour embedded in the tip of the appendix. This was of a whitish yellow colour. Histological examination proved the tumour to be a carcinoid; it was composed of clumps of polygonal cells embedded in a fibrous tissue matrix. The cell clumps were all of the same size, columnar in shape and arranged in a palisade round the clump.

This patient was again admitted to hospital in 1935, with chronic cholecystitis. Cholecystectomy was performed, a gall-bladder containing several large stones being removed. There was no sign whatever of any secondary tumours.

Case 2.—Male, aged 22, was admitted to H.M.H.S. Garth Castle, on June 17, 1917, as a case of acute appendicitis. He was taken ill six hours prior to admission and had vomited twice. On examination he appeared to be in pain and lay in bed with his legs drawn up. His pulse was 90, temperature 99·4° F., and respirations 18. The abdomen was slightly distended and there was definite tenderness in the right iliac fossa. Appendicectomy was performed two hours after admission, the abdomen being opened through a gridiron incision in the right iliac fossa. A thickened, kinked and retrocæcal appendix was removed, and the stump invaginated by a sero-muscular purse-string suture into the cæcum. The wound was closed without drainage. On slitting up the appendix a small pea-like tumour was found in the distal extremity of the appendix, the appendix itself showed signs of subacute inflammation. Histological examination of the appendix revealed acute inflammation of the wall and the small tumour was found to be a typical carcinoid. The patient made an uninterrupted recovery and was discharged after three weeks in hospital.

Case 3.—Elizabeth H., aged 19, was admitted to hospital in May, 1919, as a case of acute appendicitis. She was sent home from her work because of abdominal pain and vomiting. On admission to hospital her temperature was 98·4° F., pulse 76, and there was very little to be made out on abdominal examination. A simple enema was given with a good result and the patient appeared comfortable. The next day the temperature rose to 99·4° F., and there was some tenderness in the right iliac fossa. Operation was decided upon and the abdomen was opened through a gridiron incision in the right iliac fossa. The appendix was kinked and adherent to the root of the mesentery, it was removed with difficulty and the abdomen closed without drainage. The appendix did not appear to be obviously abnormal except that there was a definite bulbous tip which, on section, proved to be solid. Histological examination revealed a carcinoid tumour. The patient made an uninterrupted recovery.

Case 4.—Fanny W., aged 17, a domestic servant, was admitted to hospital on July 16, 1924, with acute abdominal pain of several hours' duration. The question of a ruptured ectopic gestation was considered, as the patient had missed her period and had a slight blood-stained discharge from the vagina. The abdomen was rigid in the right iliac fossa and a small hard lump could be palpated in this fossa. The temperature was 100° F. and the pulse 98. An exploratory laparotomy was performed under gas and oxygen anæsthesia. The abdomen was opened through a right paramedian incision, and an acute appendix wrapped in omentum was discovered. Appendicectomy was performed, and on exploring the pelvis a large blood-cyst of the right ovary was seen and removed. The abdomen was closed without drainage. The appendix was sent to the pathological laboratory for examination and was reported as acute gangrenous appendicitis with a carcinoid tumour near its base. The patient made a good recovery.

Case 5.—Rose J., aged 20, was admitted to hospital on May 12, 1927, with acute abdominal pain and vomiting. The abdominal pain commenced about six hours prior to admission. On examination the abdomen was somewhat distended and tender on the right side. The tongue was furred and dry. The rectum was loaded and a simple enema given to relieve this had a good result. The temperature was 99° F. and the pulse 82. Four hours later the pain in the right iliac fossa had increased and the patient vomited, whilst the pulse rate had increased to 90. Appendicectomy was performed through a gridiron incision in the right iliac fossa. An inflamed retro-cæcal appendix was removed and the wound closed without drainage. The patient made an uninterrupted recovery. The appendix was thickened and at the distal end a small rounded lump could be palpated. On section the distal end of the appendix was completely obliterated by a solid tumour (fig. 1). Histologically the tumour was a carcinoid (fig. 2), showing bunches of small cells surrounded by fibrous tissue.

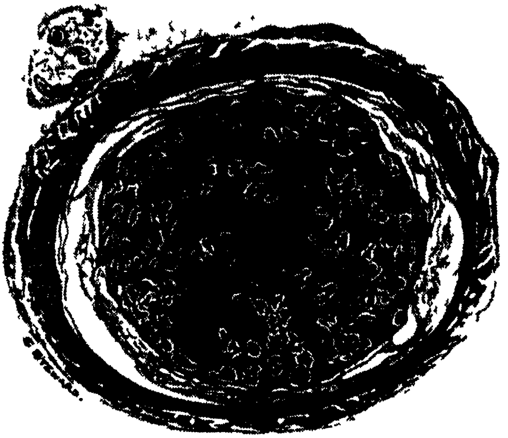

FIG. 1.—Low power drawing of a section through the tip of the appendix, showing how the carcinoid tumour fills the lumen of the appendix.

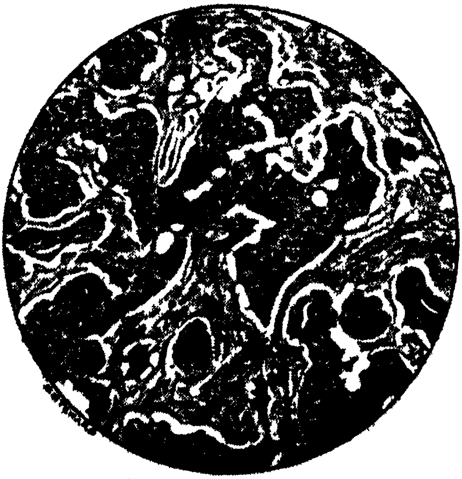

FIG. 2.—Microscopical drawing of carcinoid of the appendix, showing the small cells arranged in masses.

Case 6.—Male, aged 24, was admitted to hospital on May 14, 1936, as a case of chronic appendicitis. He had suffered from two attacks of subacute appendicitis and had been on the waiting list for two months. Appendicectomy was performed through a small muscle-splitting incision in the right iliac fossa. The appendix was retrocæcal, kinked and contained an obvious concretion. The wound was closed without drainage. The appendix, which was examined histologically, was found to contain a carcinoid tumour at its tip. The patient made a good recovery and was discharged on the tenth day after operation.

COMMENT

These six personal cases give a rough idea of the frequency of these tumours in a series of just over two thousand cases of appendicitis in which operation was performed during the years 1915–1936. It is only a rough idea, however, as only a small number relatively were submitted to histological examination. It is a great pity that surgeons as a whole are not more pathologically minded. They should insist on a routine examination of all tissues removed at operation. By so doing they are likely to get nearer the truth regarding these interesting tumours of the appendix.

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A SHORT ACCOUNT OF THE DUKE-FINGARD TREATMENT FOR DISEASES OF THE RESPIRATORY PASSAGES

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AND
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IN recent years much useful and important work has been done with medicated liquids nebulized by means of compressed air and conveyed to the bronchial tubes and the alveolar surfaces of the lung. The duration of these applications is necessarily a short one and the limit of their efficacy is therefore soon reached. The late J. J. Duke worked on the method of passing dried and warmed air, which held the medication in molecular suspension, into the atmosphere in which the patient is placed. Many attempts have been made in the past to perfect a satisfactory method of inhalation treatment, but the results have hitherto always been disappointing. Up to the present it has always been found impossible to prepare a combination of ingredients possessing the necessary bactericidal properties but innocuous to healthy tissue. After researches extending over a considerable period of time Duke found that phenol mixed with a combination of essential oils and glycerine would accomplish this aim. In collaboration with his nephew, Mr. D. Fingard, a chemist, the mixture was eventually modified to contain briefly as its constituents, phenol in combination with a carefully blended mixture of the essential

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This article was mainly the work of the late Lt.-Col. Gunter who did not live to see its completion.

oils, aromatic substances, iodine, creosote and other coal tar derivatives. The latter enable the system to absorb large quantities of phenol without any deleterious effects. The proof of this lies in the fact that patients have been treated continuously over periods of more than fourteen months with great benefit and no harmful results of any kind whatever. This fact should be borne in mind by all who desire to realize what can be effected by means of this inhalation treatment under review.

The treatment is worked on the same principle as that used by the late Dr. Gambier at the Eversfield Chest Hospital, St. Leonards-on-Sea, fifty years ago. Outside air is brought into an apparatus which dries, warms and medicates it before it is passed into the room where the patient is placed. In comparison with the usual medicinal treatment of diseases of the upper and lower respiratory tract the Duke-Fingard method offers a far better prognosis, for it has been clearly shown that the duration of the treatment is shortened, while the results obtained appear to be permanent so that the patient's mental and physical condition is thereafter kept at a high level.

METHOD

The technique of the treatment is as follows:—

The patient is placed in a room which is maintained at a mean temperature of between 70 and 80° F. An apparatus fitted with a noiseless electric fan draws fresh air from the outside through a sealed orifice. The air is first dried by being passed through a calcium chamber after which it is warmed by an electric heater and then passed over a series of trays containing the medication. Finally it is passed into the room, which is as nearly as possible hermetically sealed in order to prevent the humidity of the atmosphere from exceeding 40 per cent. and also to avoid the escape of the medication. It is important that the relative humidity should not rise above 40 per cent. nor the temperature drop below 70° F. The course is graduated, beginning with, say, three hours, and going on to sixteen hours daily. The prolonged periods of treatment are administered while the patient sleeps. It should be noted that while under treatment the patient may lie in bed or sit in the room and resort to any form of work or recreation according to his degree of physical fitness.

To attain satisfactory results the duration of the treatment should be in direct ratio to the intensity of the pathological processes present.

EFFECTS OF THE TREATMENT

The most convenient method of estimating results is to study symptoms individually and to observe the effects produced upon them. All the tuberculous patients were X-rayed before and during the course of the treatment. In some instances the patients may at first complain of a slight irritation of their conjunctiva and their nose and throat passages, but this rapidly passes off as they become accustomed to the medication.

Bronchial asthma.—There are considerable numbers of cases in which bronchial catarrh appears to be the exciting cause of asthma. This is the only solution which offers an explanation of the astonishing rapidity with which such long-standing cases have consistently responded and remained free from symptoms. The steps of the cure appear to be as follows :—

(1) The solvent agents of the medication dissolve, liquify and render easy the ejection of the products of the catarrhal condition.

(2) The prolonged inhalation of the molecularized compound has an inhibitive effect on the organisms associated with the catarrhal state in a way quite impossible with vapour treatment using compressed air as the vaporizing agent. In these methods the vapour is not in contact with the pathological condition, after the protective catarrhal products have been ejected, for a sufficient length of time to have an effective influence in the underlying morbid processes. It is also a matter of some doubt whether the vapour produced by compressed air is able during the necessarily short period of its application to come in contact with the whole alveolar surfaces of the lungs.

(3) When the bacterial growth has been eliminated there is a tendency towards the restoration to normal of the bronchial mucosa and the lung tissue.

The aim of the treatment in these cases, is, therefore, the removal of the catarrhal conditions and the bacterial products, which act as allergens. The following cases are of interest :—

Housekeeper, aged 57. Bronchitis, 30 years. Asthma, 18 months· Infected antrum, great dyspnœa. Weight, 6 st. 4 lb.—loss of 2 st. 6 lb. in less than a year. At end of six weeks' treatment no asthma, no dyspnœa. The pulse rate dropped from 108 to 80, and respiration from 28 to 18. Weight, an increase of 3 lb. two months after conclusion of treatment, no asthma, no cough in spite of wintry weather. Further increase in weight. Energy and general fitness excellent.

Doctor's wife, aged 45. For four years distressing cough day and night and frequent colds. Chronic bronchitis, bronchiectasis, tinnitus for seven years, asthma and attacks of exhaustion and fatigue. After three weeks' treatment: Cough less, voice clear, tinnitus gone, increased weight, not so nervy. After five weeks' treatment: No cough at night (used to have 300 paroxysms of coughing at night), very rarely in daytime; general condition greatly improved, eats well, increase in weight, looks fifteen years younger.

Colds and post-influenzal coughs have also quickly responded to the treatment.

Male, aged 58. Ex-agricultural seedsman. Post-influenzal cough nine weeks, causing very little sleep, exhaustion and cardiac embarrassment. Cured in eight weeks.

Sinus and antrum infections of long standing which have not responded to surgical measures have cleared up. Here it may be necessary to use local applications during the treatment so that the medicated air may reach the affected parts through the ordinary nasal respiratory tract as unimpeded as possible.

Male, textile manufacturer, aged 24. Nasal catarrh since aged 5. Tonsils and adenoids removed at 7. No improvement. Nasal operation three years ago. Radical antrum operation four months ago. As left antrum was also affected it was decided to try inhalation treatment before doing anything further. Prior to treatment could wash out and expel sufficient pus to fill a small "jam jar" in three to four days. After three weeks' treatment the washings from the operated side and that expelled from the non-operated side were negligible.

Cases of bronchiectasis have progressed in a remarkable manner which bears no comparison with any treatment hitherto tried on the cases under observation.

Bronchitis and emphysema.—In most cases these ailments are rarely dangerously severe though they are nevertheless of great importance both to the individuals and to the community. Among the disorders that make people feel unwell acute and chronic bronchitis and emphysema hold a prominent place. Indeed, together with the common cold in its various stages they occupy the most prominent place, for it is certain that the diagnosis most frequently made in Great Britain is a disorder involving the upper respiratory tract. In this connection the Duke-Fingard inhalatory method of medication has been a real contribution to medicine. Superficial breathing, which is usually present, gives way to more effectual inspirations, thus aerating the parts and permitting the beneficial influence of the medication to reach the areas where residual air gathers. In this way the condition is ameliorated.

Doctor's wife, aged 60. Chronic bronchitis five years. Could not walk up any incline. After four weeks' treatment totally cleared up, feels ten years younger and can now walk up a hill as well as she can down.

Female, aged 28, secretary. Constant cough two years. Loss of weight from 8 st. 5 lb. to 7 st. 6 lb. No definite signs of active tuberculosis. Treatment one month, cough disappeared, digestion much improved. Five months later has gained 9¾ lb., no symptoms of catarrh, now works longer hours.

Gas cases in warfare.—In cases of bronchial involvement from irritation of the lungs and the bronchial tissues as the result of injury from gas in warfare a clinical picture is seen similar in character to cases of advanced bronchitis and therefore this treatment is applicable.

Blacksmith, aged 40. Shrapnel wounds of chest and gassed during the war. Severe attacks of bronchitis and asthma several times during day and three to four times during night. Quite unable to work. Only relief from Spiess-Drager method which made life just bearable. Treatment two months. Completely recovered, travels daily 100–200 miles by car. Gained 3 st. 8½ lb. in weight. Married. Recently insured £1,000 first-class life after stringent medical examination.

Pulmonary tuberculosis.—In this disease the time factor prevents claims as positive as those for the other respiratory disorders, since none of the cases has been on record for longer than fifteen months. The cases described below were all long-standing terminal ones, for which in the ordinary way no further treatment, either medical or surgical, was possible. Yet their response is highly gratifying. Even with such cases as these it is felt that if nature can be assisted over certain difficulties in the way of relieving prominent symptoms and at the same time assimilation and nutrition are promoted, some progress has been made towards helping recovery. The laboratory reports on the sputum examination show a progressive diminution of bacilli per microscopic field. X-rays show that the infiltrated areas are diminished and the general picture shows clearing of the fields.

Milkman, aged 21. Bilateral pulmonary tuberculosis. Aphonia one year. Vocal cords nodular. Dyspnœa++. T.B.++. After five months gain of 13 lb. After ten months treatment still retains this weight in spite of 5 miles daily walk. Voice recovered. Large cavity L. apex reduced by one-third. Dyspnœa has gone. Sputum T.B. neg. June 15, 1936. Eight months negative sputum.

Engineer, aged 18. Bilateral pulmonary tuberculosis. Extensive infiltration and cavity formation both lungs. Sanocrysin had to be abandoned owing to nephritis. Weight 8 st. 2 lb. After twenty-six weeks of inhalation treatment general and local condition sufficiently improved for A.P. treatment for mid-zone cavitation L. lung. Sputum still +. Weight 9 st. 5¾ lb. This case was a gamble, as he was considered hopeless on admission. His resistance has definitely improved by the treatment. June 15, 1936. Now being discharged.

Lorry driver, aged 26. Weight 8 st. 1 lb. Temp. 97°–104° F. Pulse 68–120. Sputum T.B. +. Massive consolidated L. mid zone; dry pleurisy L. R. marked infiltration upper, mid and lower zones with probable cavity formation mid zone. Vomiting after every meal. After five weeks treatment was discontinued, as the case appeared hopeless, but the treatment was restarted and after five months he gained 9¼ lb. Sputum neg., very scanty, temp. normal for seven weeks. Up four hours, walks half an hour. Continues improvement with negative sputum. June 15, 1936. Six to nine months negative sputum; 14 lb. gain in weight.

In tuberculous cases the improvement is necessarily slower than in the other affections of the respiratory organs, but each case has followed, with slight individual variations, the same course. There is an initial period during which the patient gets accustomed to the vapour, when no change is observed. This period is followed by a steady general improvement in all the symptoms. It is definitely progressive and is accompanied by the most astonishing change in the mental outlook of the patient. Many people are inclined to look upon this as the usual optimism of the tuberculous subject, but it goes much further than this and none of the patients has so far lost it. As pointed out above only time can tell whether a permanent cure will be established, but the actual appearance of new fibrous tissue in the cavities, accompanied by a negative sputum, holds out more than a mere hope of such an achievement.

SUMMARY

Briefly summarized the results of the treatment have been :—

(1) A rapid checking of the cough and lessening of the amount of mucus. Patient is enabled to pass better and more comfortable nights.

(2) Sputum decreased in amount, due no doubt to the healthier condition of the respiratory tract.

(3) Dyspnœa definitely relieved as the toxic state of the body and of the respiratory tract improves, thus diminishing the strain on the heart.

(4) Nutrition promoted, as shown by the definite and progressive increase in weight.

(5) General condition improved, energy regained and the mental outlook of the patient changed for the better.

(6) There is no disturbance of the digestive, intestinal or genito-urinary tracts. Hæmoptysis is not induced and any staining is no bar to the treatment being started.

All the cases treated have been taken indiscriminately, as they have applied for treatment. No case has ever been rejected on any medical grounds, no matter how hopeless it appeared to be. Practically all have been chronic cases, which had refused to respond to any other kind of treatment previously tried.

THE PROBLEM OF NUTRITION

A REVIEW

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I

(*a*) THE three volumes* issued by the League of Nations form one of the most important recent publications on the subject of nutrition and so great has been the interest aroused in them that for some time demand has outrun supply. Such interest is welcome, for there can be little doubt that sound nutrition is the foundation of the public health. It is not only those whose work lies in the health services of the people of the world who should read and ponder the contents of these volumes, but everyone who is in the least degree involved in national and international politics. Anyone complacent concerning the public health in any country of the world or the value of well-known political nostrums of economic nationalism will receive a beneficial shock should the meaning of these reports penetrate his comprehension.

(*b*) The history of this recent development of concern about nutrition is interesting. For many years now the United States have been "nutrition-conscious." The bureau of Home-Economics has bombarded the public with pamphlets about calories, proteins, mineral matters and vitamins. The universities have sedulously trained students in dietetics and given degrees in this subject. For long, dietetics has opened a career for women in the United States, either as hospital dietitian, or as consultant working hand in hand with the physician, or as "nutritionist" employed by local, state or national authority, to preach the gospel of nutrition to the public of the towns and villages. When the crisis came, and National Reconstruction became the watchword, it was inevitable that such a country, so "nutrition-conscious," would ask itself whether the national agricultural policy of the United States was directed to the feeding of the people, or whether it was evolved to safeguard some particular political interest. Thus the idea arose—surely a self-evident idea—that it would be well if the national agricultural policy had as its aim the right feeding of the people, and, by extension, that world agricultural policies should have the same end. (As may be seen from these volumes the achievement of these desired ends is far distant.)

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* The Problem of Nutrition. Volume I. Interim Report of the Mixed Committee on the Problem of Nutrition. Pp. 98. Price 2*s.* Volume II. Report on the Physiological Bases of Nutrition. Pp. 27. Price 6*d.* Volume III. Nutrition in Various Countries. Pp. 271. Price 5*s.* 6*d.* Published in Great Britain for the League of Nations by Allen and Unwin, London.

Now Australia has been, and is largely, under the dominance of American ideas. Australian dietetics were mainly American dietetics (though nowadays there is a welcome tendency to turn to "the Old Country") and consequently it is not surprising to find that it was the Australian delegate to the Assembly of the League of Nations, Mr. Bruce, who introduced the idea to international politicians and used the picturesque phrase of the "marriage of agriculture to public health." The idea fell upon soil well prepared to receive it, germinated, and has borne as first fruits, in remarkably quick time, these three important volumes.

(*c*) The first volume will be the most generally read, as it gives readily and in mostly easily assimilable form the findings of the "Mixed" Committee (of economists, agricultural experts and medical scientists) on the Problem of Nutrition. This Committee has utilized the Report on the Physiological Bases of Nutrition, which constitutes volume II of this publication as a yard measure of the nutrition of the different countries of the world, and volume III gives the data, as far as they are available, of the food consumption of different countries throughout the world. Thus volume I concerns the average man and woman of intelligence in any walk of life, volume II more particularly the medical man and student of dietetics, and volume III the economist, agriculturist and politician. This is not to say that these people ought to confine themselves to their own particular volumes. In fact volume III contains much " fine confused feeding " and out of it can be dug such information as that the consumption of cheese in Great Britain in 1934 stood at the ridiculously low figure of 10 lb. per head per annum compared with 143 lb. of meat, and that Buenos Aires has a Municipal Institute of Nutrition, consisting of (i) a hospital with 100 beds, out-patients' department, canteen for nutrition services and analytical laboratories, (ii) a Municipal School of Dietetics, (iii) a Chair of Clinical Medicine, (iv) Food Research Laboratories and (v) a social service for supervising and protecting healthy individuals (pp. 69, 80, 164 and 198). All three volumes have their value and no one interested in problems of nutrition from whatever aspect can neglect at the least a perusal of all of them.

II

(*a*) Though the scope of the Committee is intended to be world-wide, the present reports are limited to the countries of European and Western Civilization. By the latter term is meant such countries as have been colonized from Europe, such as the United States of America, the Argentine, the Union of South Africa, and Australia, and have European dietetic habits and customs. In the Far East, in Asia and Africa, there are not enough data for satisfactory generalization and the Committee must wait on the investigations in tropical regions and Far-Eastern countries which have been initiated by the League of Nations Health Organization. As public health must wait upon adequate nutrition, the Mixed Committee have in their interim report (vol. I) laid especial stress upon the relation of adequate nutrition to public health. There are sufficient data concerning this relation to permit of far-reaching recommendations to the governments represented for the improvement of public health, and the Committee have not shied at the task of making these recommendations in no uncertain voice.

(*b*) The Committee ask (vol. I, p. 15) " Is there a nutrition problem ? " In other words, is all for the best in this best of all possible worlds in nutrition, or are there indications that there remains sufficient to be done in improving the nutrition and, through nutrition, the public health of the world (or at least of countries of European and Western Civilization) to make a fundamental alteration of the policies in agriculture and the regulation of exchange of food commodities between nations not only advisable but absolutely indispensable ? The Committee decide, as anyone with a knowledge of dietetics would decide, that there *is* a problem and as a preliminary quote the United States of America. " In (this country) it was thought, until recently, that the standard of life was high, especially having regard to recent improvements in the popular dietary, more especially with regard to the consumption of milk and other protective foodstuffs." None the less investigation by competent dietitians has shown that numbers of people are insufficiently fed and a much larger number badly fed. In Great Britain, according to Sir John Orr, the poorest 10 per cent. of the population have a diet insufficient in every commodity to promote normal health, the next 20 per cent. take a diet adequate only in protein and fat, and even the next 20 per cent., living at a higher income level, have a diet which is inadequate in one or other mineral matter or vitamin, and therefore incomplete and sub-optimal in value. In other words, 50 per cent. of the inhabitants of Great Britain are obtaining a diet which is " no better than it should be," i.e. is much worse than it ought to be. Similar conditions obtain in other countries. " In no country does the whole population attain the standard scientifically desirable in the interests of health " (p. 16).

(*c*) That this is the case is not surprising, quite apart from the question whether or not poverty is the root cause of malnutrition (*see* Vol. I, p. 81). " Instinct and appetite alone cannot be regarded as reliable guides in the choice of food." If for " instinct " is read " habits " or " conditioned reflexes " or even " tribal tabus," it will be realized that there is too much flying in the face of dietetic common sense, and that the only hope of building up a healthy people through a satisfactory dietary is the *education of the people in simple dietetics and the provision of the necessary foods at prices which can be afforded.*

Modern research has shown that the problem of obtaining an optimum diet is sufficiently complicated, for in addition to the necessary complement of calories and protein there are twelve mineral elements which play an important part in human nutrition and nine vitamins, the absence of any one of which gives rise to a specific disease characteristic of defective nutrition. Fortunately for the lay mind, it is sufficient to realize that an adequate supply of mineral inorganic elements and vitamins can be obtained by an intake of the " protective foods " which consist mainly of products of dairy farming and of the market garden and the fishing industry. It is to the improvement in the production and supply of these commodities to which the Committee look for the improvement of the health of the nations and which they recommend to the governments represented in the League of Nations.

" The objective must be, not to attempt to prescribe a single type of diet for all the peoples of Europe and other countries of Western civilization but to promote the development of agricultural pro-

> duction along the lines which science makes possible, having regard to the differences of soil, climate, etc., with a view to providing the most efficient food supply, taking into consideration the traditional dietary habits of the people " (p. 19).

As an illustration the Committee take the emphasis some countries lay upon the need for consumption of meat, meaning by " meat " the muscular parts of the animals consumed for food. Now Great Britain, as stated above, takes 143 lb. of meat per head per annum against an intake of 10 lb. of cheese and 180 pints of milk. As " it is an established fact that the human body cannot subsist solely on the muscular parts," it is clear that a decrease in the amount of meat eaten accompanied by an increase of such protective foods as cheese and milk and market-garden produce would be advantageous to the health of the nation, and an agricultural policy tending in that direction should be the aim of those in whose hands the direction of national policy lies. So far the policies of Great Britain in agriculture have shown but little acknowledgment of this need.

(*d*) The Committee rightly urge that the health of the child is the kernel of the problem.

> " Pregnant women, nursing mothers, infants and young children must be considered from a nutritional standpoint as the most vulnerable portion of the population, in the sense that damage in childhood by bad food cannot be subsequently repaired."

They point out again and again the importance of milk in the nutrition of the young.

> " An abundant supply of milk is therefore an essential item in the diet of children [and of pregnant and nursing women] in order to secure a sound physique and good health. There is, unhappily, no less abundant evidence that very few countries, if any, have as yet attained the standard which secures to the child population as a whole this essential basis for sound nurture.
>
> " In the light of these facts, attention should chiefly be concentrated on ensuring adequate nutrition for the young. Remedial treatment for the older age-groups, who must often be regarded as 'damaged goods,' must also have its place in the planning of a nutritional campaign; but it is the preventive rather than the curative aspect of the problem which should be given the first place " (Vol. I, p. 21).

No words should be necessary to emphasize this point which has been made since the beginning of scientific medicine. Unfortunately for dietetics, lay audiences and even medical audiences are more interested in the remedial dietetics applicable to the adult than in preventive dietetics applied to the young. Just as the length of expectation of life has been increased by the decrease of infantile mortality, so will the need for remedial dietetics be decreased by adequate feeding of the young.

(*e*) The Committee very rightly complain of ignorance of dietetics in all ranks of society, and look to teaching and propaganda to produce important results. They point to universities, elementary schools and secondary schools as a means of spreading the gospel of correct nutrition and to doctors and hygienists for remedial and preventive nutrition. Wisely they say the teaching must be coordinated by some central authority.

Anyone who has wrestled with the problem of teaching the public dietetics is inclined to ask *Quis custodiet ipsos custodes?* The older Universities, though splendid centres of research in nutrition, do not recognize dietetics as a subject of study, and even if they did, have no tradition of bringing such knowledge into the market place; while the younger Universities, where courses of study have been organized—and they are very few—organize that study only in training hospital dietitians. Their work is directed to remedial and not to preventive ends. It is true that in Vol. III, pp. 206–214 there is an impressive list of public and private bodies engaged in nutritional work, but for anyone behind the scenes, there is a lack of organization which frustrates effort. The public is left at the mercy of the patent food and medicine vendors and is a prey to any well-advertised scheme of diet however fallacious its fundamental principles.

The Committee say that—

> "There is no need to enumerate the methods of reaching the general public . . . The public can be given pamphlets, books, propaganda articles in the Press; it can listen to lectures and wireless talks, and can be shown posters, pictures and films. The aim should be to make recent discoveries in the science of nutrition available in a simple form; to spread such teaching among ever wider circles and gradually to convert the results of scientific researches from current opinions into daily habits. By these various means, the housewife will be taught how to choose food and how to prepare wholesome meals which are suited to the physical needs of her family and are at the same time economical" (Vol. I, p. 24).

The Committee assume that there are sufficient competent people to undertake this work, when, as a matter of fact, in this country there is almost a complete dearth of such people whether among the laity or the medical profession. The need in this country is for some dietetic centre such as is said to be in full working order in Buenos Aires (*see* p. 749), or a scheme such as sketched in Vol. III, p. 256, in which the public authorities have assumed major responsibility for an educational programme in nutrition. "The Extension Service [i.e. in the U.S.A.] has a nutrition programme in every State, coordinated by a nutrition specialist from Washington working through the nutrition specialists in the States, and extended down into more than 1,350 counties through the home demonstration agents."

When there is a nutrition specialist in Whitehall coordinating the teaching of nutrition in the fifty-two counties of England and Wales through nutrition specialists trained to that end it will be possible to begin to believe that the housewife may, in the end, "choose food and . . . prepare wholesome meals . . . suited to the physical needs of her family and . . . at the same time economical." At the present time, though Whitehall is keenly alive to the importance of nutrition, the "nutrition specialists" do not exist.

(*f*) When the Committee come to the discussion of Economic Considerations, Agriculture and National Nutrition Policy and Social Welfare the report indulges —it is a welcome indulgence—in pretty plain speaking.

It makes the obvious point that " Fresh milk, fresh vegetables and fresh fruit are clearly best produced in the neighbourhood of the market where they will be consumed." It points out that these commodities—i.e. the protective foods which are the main deficiency in the British diet—are well adapted to a structure of agriculture in a densely populated country. In other words we have, in Great Britain, only ourselves to blame if we do not get sufficient protective foods. If " deficiency diseases " are preventable, why not prevented?

The Committee call attention to the large margin or spread which is often found to exist between the wholesale and retail prices of given commodities.

> " The glaring contrasts in value which are often brought to notice create a popular discontent shared by producer and customer."

They state categorically

> " the main cause of malnutrition is poverty. Malnutrition can never be overcome when poverty is its principal cause, except by increasing the income of the poor."

And again

> " the campaign for improved nutrition launched at last year's Assembly would have an excellent prospect of achieving its object if Governments, when called upon to take important decisions affecting production and trade—both national and international—should henceforward concern themselves as much with maintaining the nutritional basis for public health as with safeguarding the legitimate interest of producers."

There is little need for comment. In effect the Committee say :—Malnutrition is the result of poverty. Protective foods are dear because farming policy takes insufficient account of them, the middleman's profits are too great and governments care for none of these things. To illustrate the way in which governments may by their economic policy raise the price of important foods the Committee quote from " Workers' Nutrition and Social Policy," International Labour Office, 1936, p. 112 and 113.

> " The ' world price ' of butter in the year 1934 was 1·72 Swiss francs per kilogramme. In Italy, the price was 3·03 Swiss francs;

in France, 3·55 Swiss francs; in Germany, 3·79 Swiss francs; and in Switzerland, 4·75 Swiss francs. The differences between these national prices and the world price of 1·72 Swiss francs must be attributed to the effects of tariffs, quotas and other restrictions."

So far, in this country, the price of butter has not been affected by restrictions. The medical profession must protect this important food and the nation from the political wiles of the home producer.

III

(*a*) It is the section entitled " Nutrition and Health" which will appeal most to the man whose interests are purely medical. The fundamental facts of dietetics are very simply set forth and the Committee have published an extremely valuable table which shows at a glance

NUTRITIVE VALUE OF FOODS

Food.	" Good " protein.	Minerals.	Vitamins. A	B	C	D	
Milk	++	+++	+	+	+ø	+ø	
Cheese	++	++	+	+	—	—	
E Eggs	++	++	+	++	—	++	
E Liver	++	++	+	++	—	+	
E Fat fish (herrings, etc.)	+		+	+	—	++	Highly protective foods.
Green vegetables, salads	+	+++	+	+	++	—	
Raw fruit, fruit juices		+++	+*	+	++	—	
E Butter	—	—	+	—	—	+ø	
Cod-liver oil	—	—	+++	—	—	+++	
Yeast	+	+	—	++	—	—	
Meat (muscle)	+	⊥	—	+	⊥	—	
Root vegetables, tubers			+*	+	+	—	
Legumes (dry peas, lentils)			—	+	—	—	Less protective and non-protective foods.
E Cereals, bread (whole-meal)	+	⊥	⊥	+	—	—	
E Cereals, bread (white)			—	—	—	—	
E Cereals, rice (polished)			—	—	—	—	
E Nuts	⊥		—	++	—	—	
E Sugar, jam, honey			—	—	—	—	
E Margarine, olive oil and other vegetable oils			—	—	—	—	

E = foods of high energy or calorie value.

+++ signifies very rich. ⊥ signifies present in small amount or traces.
++ „ rich. — „ absent.
+ „ present. ø signifies in summer, when the cows are on pasture.
* signifies if yellow in colour.

what foods are valuable for mineral matters and vitamins and what for energy. This table is reproduced here with the suggestion that a plus sign should appear under vitamin C in the line dealing with liver, and under minerals in the line dealing with fat fish, the flesh of which contains potassium phosphate and unavoidable bones contain calcium phosphate. Also it would be well if E were prefixed to cheese and legumes. Two sentences connected with this table are to be highly commended as immensely useful in training lay audiences in the principles of dietetics, namely :—

> " A useful division of foods into two classes has been made—(1) the protective foods, those chiefly valuable for providing minerals, vitamins and 'good' protein, and (2) the non-protective foods, chiefly valuable as energy-providers. Lack of calories causes starvation, lack of protective foods causes various 'deficiency' diseases which may develop in spite of an abundant calorie intake."

If the ideas set forth in these sentences and table could only be fixed in the heads of the public, there would be no further need to teach dietetics !

(*b*) A further two sentences from this part of the report are picked out for commendation.

> " The ordinary mixed diet should form a collection of protective and non-protective foods supplying the requisite energy for the body's activity and containing all the necessary protective elements in a correct balance. An unlimited number of different diets could be composed, all of which would satisfy this nutritional ideal."

If the truth of the last sentence is grasped, overboard go all the freak diets which are supposed to be able to regenerate humanity.

(*b*) The Committee run through the special dietary needs of different classes and age-groups. They point out that expectant and nursing mothers need abundant sources of calcium, iron, iodine and vitamins, and state that the muscular soreness and weakness that accompany pregnancy in many women and are not relieved by rest at night have been shown to clear up on giving extra calcium and vitamin D. They show that the artificially-fed infant suffers from anæmia due to a lack of iron in the diet, that he has a diminished resistance to broncho-pneumonia, intestinal and other infections, and that his risk of dying in the first year is sixty times as great as that of the wholly breast-fed. The malnutrition of infancy, they say, is due to a "pernicious combination of poverty and ignorance." They point out that between two and five years of age is a dangerous period of existence and that it is *during those years that the health supervision of most countries loses sight of the children* with the result that as they enter school they are already "damaged goods." (What else can be expected when in an investigation in that comparatively well-fed country, the U.S.A., 90 per cent. of the pre-school children were getting an inadequate diet, 57 per cent. never received any fresh milk, 16 per cent. no milk of any kind, 59·5 per cent. no eggs, 60 per cent. no fruit, and 50 per cent. no vegetables other than potatoes.) They remark that there is evidence from all parts of the civilized world of malnutrition in the schoolchild and quote the convincing evidence of the value of good food in improving health and physique from Dr. Friend's work at Christ's Hospital and Dr. Corry Mann's in a well-known orphanage. They conclude this portion with evidence of undernutrition in adolescence, in young soldiers and in adults. "Every fresh enquiry, in town or country" they say "reveals either patent or latent malnutrition."

(*c*) Much of the rest of this portion of the report is a recapitulation and a commentary on the dietary standards adopted in the London Report. This originally appeared December, 1935, and now has been amplified in Vol. II of this report. The general recommendations are:—

(1) Although a simple diet may be chosen with perfect safety, none the less variety in diet, provided it contains protective foods, is a counsel of wisdom.

(2) Potatoes should replace cereals so far as possible, and an excessive consumption of sugar, because it crowds out protective

foods, is to be condemned.

(3) Milk should be a conspicuous element of diet at all ages, especially for pregnant and nursing women (one litre a day) for infants, for children of all ages and adolescents.

The provision of free milk to these groups is recommended.

(4) Fresh vegetables and fruit should be constituents of the mixed diet.

(5) Extra vitamin D is essential whenever and wherever sunshine is not abundant.

(*d*) Concerning the rest of the report it is sufficient to cull a number of quotations :—

" . . . the majority of low-income workers consume an insufficient quantity of calories."

" . . . the intake of protein by workers in the lowest income group falls below [the satisfactory minimum]." " Workers' families with low incomes evidently find the protective foods too expensive and cannot afford them. *The question of income is thus at the root of the worker's nutrition problem.*" " . . . on the basis of the London standards, the average diet in the lower income groups is inadequate for health."

" . . . the gaps between available knowledge on nutrition and the application of this knowledge are very wide indeed." " Adequate nutrition cannot be assured by a policy directed exclusively towards countering the effects of the depression. The need for a constructive nutritional policy will not cease when the last signs of the depression have disappeared." [In writing of means for lowering the purchase price by reducing the services provided by the distributor.] "In Northern Ireland . . . after a certain hour milk is made available at less than half the normal price charged when delivered." " Governments almost throughout the world adopted special measures in the endeavour to protect the agriculturists from the effects of the slump . . . Certain of the measures adopted have . . . by blocking the channels of trade, increased the ills it was intended to avert or cure." " The Committee thus foresees a gradual re-orientation taking place in the agriculture of the industrial countries. With the growth of the demand for the protective foods, farmers will produce more milk, more vegetables, more eggs and will become less concerned over the price of wheat and of sugar."

These quotations show that the mixed committee realize and emphasize the importance of improving the nutrition of all countries, that they take a long-sighted view of the problem and that they consider that all classes alike, farmers, politicians, and consumers, have to be educated to the possibility of the marriage of agriculture and public health. Their reports deserve the widest and deepest reading and understanding.

THE NUTRITIVE VALUE OF BRITISH BEERS

By W. F. CHRISTIE, M.D.

THE recent imposition of a duty on foreign beers should draw attention to the value of British beers, but ignorance is widespread regarding malt liquors in general. This is partly due to the peculiar nomenclature from which British beers suffer. " Porter " derives its title from the fact that it was first brewed to suit the particular taste of Covent Garden porters. " India " Pale Ale is so called because it was first produced for the Indian market. " Stout " derives its name from its supposedly fattening qualities. The name " Bitter " is applied to bitter-tasting beers, " Mild " to mellow ones. The description " Strong " is applied to those of high alcoholic content, but for reasons of advertising no beers are ever termed "weak," the word " Light " being preferred. Others are known merely as " Pale Ales " and " Brown Ales." Colour is, of course, no criterion of the composition of ale, some of the most alcoholic being very pale. Darkening beer is a simple and innocuous process. Opacity is no criterion either. Clarity, no matter how much carbohydrate is present, is one of the first requisites of a popular beer.

Price is a rough guide to the quality of beer. There are cheap beers and expensive beers. Usually the higher the alcoholic and carbohydrate content, the greater is the cost. The working-man pays 2½d. for half a pint of light ale from the tap, 3d. for mild, 3½d. for pale, 4d. for bitter, and 3d. to 4½d. for half a pint of draught stout or porter.. Bottled beer costs a penny or twopence more. Low priced beers are not necessarily inferior in quality to higher priced beers, any more than a cup of weak tea is inferior to a cup of strong tea. From the medical point of view, both are valuable. Unfortunately, cost as an index of quality is vitiated by the retailer. If the consumer drinks the same beer in the " Saloon Bar " a penny more is added; if in the West End, a larger price is asked.

Neither name, colour, opacity nor price is a sufficient guide to the practitioner when he recommends a daily glass of beer to a patient. Before prescribing or rejecting it, he ought to know its chemical constitution, i.e. alcoholic strength, carbohydrate, protein and mineral content, and calorie value. Otherwise, he cannot diet scientifically his fat, lean, diabetic or debilitated patients.

ALCOHOLIC CONTENT

Beverages which contain less than 1 per cent. of absolute alcohol are regarded officially as non-alcoholic, escaping all duty. The percentage of absolute alcohol in ordinary ales and stouts varies from about 2·8 to 4·4 per cent.; thus half a pint contains somewhere between 8·0 and 12·5 grammes of absolute alcohol. Ales are sold in three and stouts in two strengths to suit the taste and pockets of the purchasers. Half a pint of the weakest ale therefore contains a little more alcohol than a glass of Rhine or Moselle wine. Half a pint of medium strength contains as much alcohol as two tablespoonfuls of neat whisky, namely—9·45 grammes as compared with 9·36 grammes. (Bitter beer and pale ales contain rather more alcohol than mild ales). " Strong " ales contain between 19·8 and 22·8 grammes to the half pint, or nearly the equivalent of five tablespoonfuls of neat whisky (i.e. a " double "). Many old ales are very strong.

It is possible to brew a beer which contains 15 per cent. by weight of alcohol, i.e. 43 grammes to the half pint, or nearly the equivalent of two double whiskies, but so little of it can be consumed that the pleasure of drinking a cool, well-flavoured glass of ale is lost. "Draught" or "Tap" beer is not originally more alcoholic than the same beer when bottled, but may become so when kept, since secondary fermentation continues more rapidly inside a wooden cask than in bottles.

It will be seen that the alcoholic content of even weak beer is far from negligible. Beer provides more alcohol, money for money, than any other beverage, which is one good reason for its popularity.

SOLID CONTENT

When alcohol and water are evaporated from beer, the residue or "extract" consists of carbohydrate, protein and mineral matter, somewhat in the following proportions :—

Carbohydrate - - -	75–80 per cent.
Protein - - - -	10–50 ,, ,,
Mineral matter - - -	5 ,, ,,

The carbohydrate in good quality bitter ale consists chiefly of the unfermented portion of malt sugar. Malt sugar contains maltose, malto-dextrins and dextrin. They are the products of the conversion of malt starch by the enzymes present in malt. Maltose is mostly consumed during the process of fermentation, producing alcohol and carbon dioxide. It is chiefly dextrin and malto-dextrin which is left in the beer. Sugar is added to practically all beers, but much less to bitter beers than to others. Malt extract is also commonly added. Sweetening agents consist of cane sugar, cane syrup, dextrose, dextrins or combinations of these, and are added after primary fermentation is complete, usually when beer is filled into cask. They not only sweeten, but also promote "condition."

The amount of carbohydrate in half a pint of bitter beer varies usually between 6·8 grammes and 11·2 grammes or, if an average is taken, 9 grammes (i.e. the equivalent of two teaspoonfuls of powdered cane sugar). Mild ales average 12 grammes of carbohydrate (three teaspoonfuls of sugar); stouts and porters average 14 grammes, but they may contain as much as 17 grammes (or four teaspoonfuls of sugar).

The protein contained in beer is second-class protein. It belongs to the soluble vegetable group, i.e. its amino-acids are less capable of replacing human protein than the amino-acids in, say, milk. Nevertheless, in so far as their fuel value is concerned, they are as good as first-class protein.

The proportion of mineral matter which is present in beer is negligible in so far as energy is concerned, but in regard to body-building capacity the phosphates and potassium which it contains are important. Phosphorus is a necessary building material, being needed for the repair and upkeep of bones, central nervous system and all cell nuclei. Potassium helps to build muscle and red blood corpuscles. Whenever the breakdown of such tissue is going on rapidly, as in the manual labourer, the addition of these minerals to those normally contained in food is a useful supplement. Although vitamins are present in brewer's yeast, they are not, so far as is known, present in any appreciable amount in beer.

There are also certain flavouring, tonic, soporific and other substances in beer, which are dissolved out of the hops. Their nutritive value is practically nothing, although they are essential to the consumer's enjoyment. With these substances this article is not concerned.

CALORIE CONTENT

Beer owes its energy value to the alcohol, carbohydrate and protein which it contains. The energy value of one gramme of absolute alcohol is 7 calories, that of carbohydrate and protein 4·1 calories. Since the calorie value of protein is the same as that of carbohydrate, it is only necessary to apply the factor 4·1 to the sum of the total solids in beer, less 5 per cent. for mineral matter, to obtain their energy value.

Just before Snowden's budget was introduced in 1931, Chapman made an extensive analysis of a large number of beers. By striking averages in the various classes he reached the following conclusions regarding the calorie value of London beers :—

London Beers.	Calories per oz.	Measure.	Oz.	Total Calories.
Mild Ales - - - -	12·2	Half pint	10	122
Bitters Pale Ales - - - -	12·2	Half pint	10	122
Stouts Porters - - - -	14·1	Half pint	10	141
Strong Beers Old Ales - - - -	24·1	Half pint	10	241

It must be noted, however, that average figures do not represent accurately the real composition of malt liquors; for instance, among London beers, mild ales were found to vary by as much as 70 calories per pint, bitter and pale ales by 57 calories, stouts and porters by 83 calories, and strong beers and old ales by 183 calories. Such differences in constitution make it imperative for the dietitian, if he wishes to be reasonably exact, to order a definite brand of known value. A bottled beer should be selected, and the Brewery asked to supply its chemical composition. At the same time, it must be remembered that even the same brand of beer varies somewhat from brew to brew. Many breweries, particularly small ones, cannot furnish analytical data of their beers, but they can always give their "original gravity" to the nearest degree. The original gravity of a beer is that which it possessed before fermentation. During fermentation, the gravity falls steadily, owing to the conversion of malt sugar into alcohol. Nevertheless, the nutritive value of the finished product depends largely on its original gravity. Supposing that a brew commences with an original gravity of 1030, it will contain 7·5 per cent. of solids. If completely fermented to alcohol, it would contain 3·76 per cent. of alcohol. The value of this brew has fallen therefore by 26 calories to the pint.

Before fermentation:

$$7{\cdot}5 \times 5{\cdot}68^{*} \times 4{\cdot}1 = 175 \text{ calories per pint.}$$

After fermentation:

$$3{\cdot}76 \times 5{\cdot}68 \times 7 = 149 \text{ calories per pint.}$$

It will be found that multiplication of the original gravity less 1,000 by the factor 5·2 gives a rapid approximation to the correct value of a pint of beer. The case quoted above works out as follows:—

$$30 \times 5{\cdot}2 = 156 \text{ calories per pint.}$$

To get more exact figures, analysis of every brew would be necessary. This rough and ready calculation does not show the respective percentages of alcohol and sugar in beer, so that it is of little use in framing diabetic diets in which the amount of carbohydrate present is all-important; but it is of real value to the dietitian of fat, lean and debilitated subjects, whose chief interest is total calorie values.

Calorie values, of course, deal solely with the potential heat and energy which is contained in food. Ale and stout have a high calorie value; moreover, they are usually consumed in addition to meals. Physical exercise was obviously intended by Nature to be the chief means of countering a surplus food intake. Suppose that the sedentary worker's expenditure of energy is about 2,370 calories per day. If he spends his leisure time in walking, he will need an additional 57 calories per mile; half a pint of mild ale will provide him with that amount of energy twice over. If he does not expend it, it will be transformed into fat. Theoretically, one ounce of human fat can be formed in the body from an average pint of beer, probably not directly, but by "sparing" other fuel foodstuffs. The beer drinker who has a predisposition to obesity must reduce his consumption of other carbohydrate foods, e.g. bread, if he wishes to keep his figure normal, or else take exercise in proportion to the total calorie value of his day's rations. The obese patient living on a reducing diet need not give up his glass of beer, provided that its calorie value is calculated into his dietary scheme.

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* Multiplication by the factor 5·68 converts grammes per cent. into grammes per pint.

Malt liquors are frequently prescribed, on account of their tonic properties, for debilitated patients who are not thin—for instance, those who have undergone a surgical operation, or mothers who are nursing their babies—without the necessary dietetic adjustment being made. Beer is fattening in these circumstances. The therapeutic uses of malt liquors are well known, but the variations in their nutritive values are less familiar. Practitioners who prescribe a glass of ale or stout for a patient should not forget that these beverages are foods, whose energy value must be included in the diet.

The writer is indebted to Messrs. Barclay, Perkins & Co., Ltd., Charrington & Co., Ltd., and Whitbread & Co., Ltd., for information used in the preparation of this paper.

GENERAL PRACTICE

NO. V—THE CHOICE OF HOUSE, CAR AND INSTRUMENTS

By E. KAYE LE FLEMING, M.A., M.D.
Chairman of Council, British Medical Association.

THE CHOICE OF A HOUSE.

CIRCUMSTANCES too often predetermine the house in which the medical practitioner must live, since practices are often associated in the public mind with the residence of " the doctor." Nevertheless times are changing, and with the times many old-established ideas regarding practitioners and their professional calling are changing likewise. The general use of the telephone, even in remote country districts has, more than anything else, increased the liberty of the practitioner in his choice of a residence. At one end of the scale we have the man who practises at one address and lives his private life at another, such as the practitioner who lives away from the centre of London and has consulting rooms in Harley Street (thus obtaining the qualification in the public mind of " a Harley Street specialist "), and at the other end the country general practitioner whose house with surgery accommodation has for generations been " the doctor's house," and must for obvious reasons remain so. Between these two extremes there lies a wide range of practices which allows more or less freedom in the choice of a residence.

In general there is an increasing tendency to separate the private and professional address of the medical practitioner without loss of practice, always provided that good arrangements exist for keeping the two in close touch with each other. In cities and large towns there is generally a locality where the leading members of the profession reside, and this type of concentration is becoming intensified as is evidenced by the Clinic in Harley Street, London. Buildings are being erected for the purpose of supplying the needs of the doctor. Perhaps the most striking illustration of this is to be found in Australia. The British Medical Association House in Sydney is one of the finest buildings of its kind and won the prize awarded every five years by the City Authorities for architectural design (Fig. 1). The building is

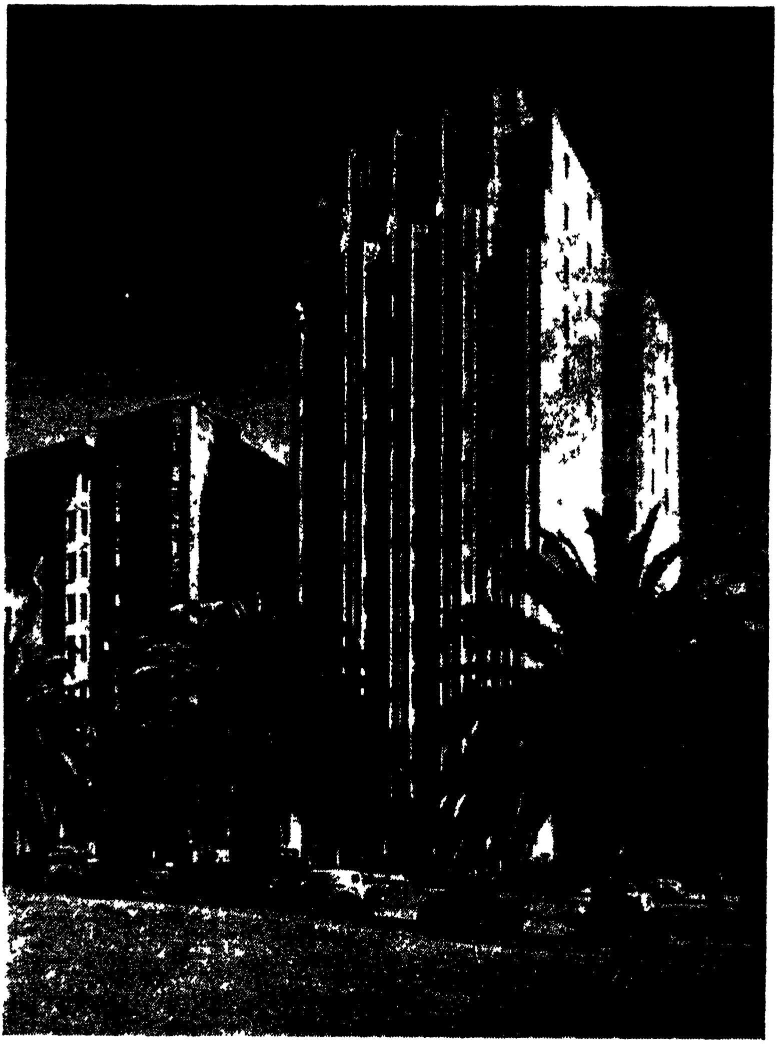

FIG. 1.—The British Medical Association House in Sydney, New South Wales.

fourteen stories high and except for the offices of the Association is composed entirely of consulting rooms and offices for medical practitioners; moreover it stands in a street which is the Harley Street of the city. At the other end of the scale is the lock-up surgery in a crowded industrial area which, while allowing more liberty to the doctor when off duty, scarcely provides for the emergency needs of his patients.

Between these two extremes there is a rapid development of a well-equipped central office for a group of practitioners in partnership with private residences in the neighbourhood. For this purpose a separate house or perhaps the first floor of a business establishment in the centre of a town is specially adapted. Consulting and waiting rooms, surgery, dispensary and examination rooms are all organized to enable the practitioner's work to be conveniently and expeditiously carried out, while his private house is left uninvaded, except at times of emergency or when perhaps he may prefer to see his good class patients in his afternoon consulting hours.

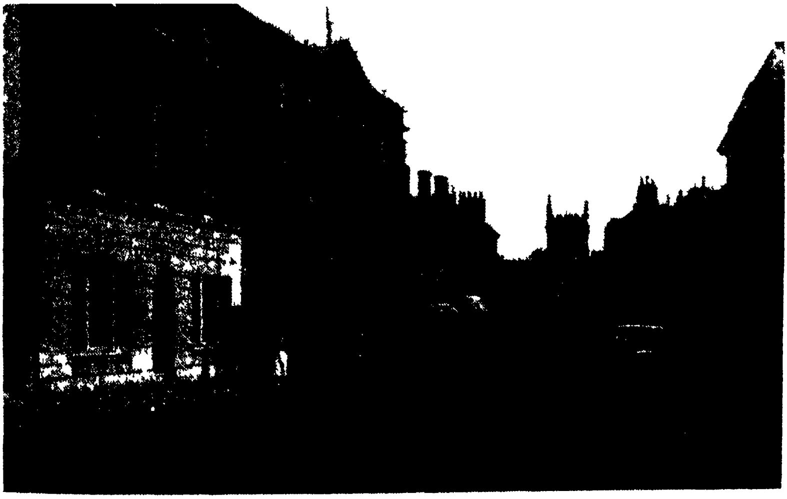

FIG. 2.—Eighteenth century house (on left) equipped as offices for a firm of partners (Wimborne, Dorset).

With all these changes there remain the large number of practitioners whose private house must also be the only address from which they practise, and for this reason most practitioners on entering practice find the house they must live in determined beforehand. Such a house must be centrally situated with a view to the convenience of the patients. The ground floor must provide the space for his requirements, and often a private house has been adapted to these needs by the addition of a surgery and waiting room with separate access. In this respect the practitioner in the country has many advantages and it is noticeable how often in motoring through villages and small towns the doctor's plate will be seen on the door of one of the most attractive houses in the street.

Fig. 3.—A country practitioner's house.
(Dr. Lucius Wood, Broad Chalk, Salisbury).

The private resident of means now prefers to live outside the town and not in it, and the practitioner who cannot exercise the same choice has been able to acquire at a reasonable rent or purchase price a fine house no longer fashionable, but eminently suited to his own needs.

When all is said and done the practitioner remains saddled with the necessity of living in a house of greater importance and cost than he would need as a private individual, both by reason of the accommodation he requires and the appearance he must keep up. With these needs, not a few will be attracted by the pleasure of practising in the country with a charming house and garden, and the relaxation that pleasant surroundings and beautiful appointments can bring after a hard day's work. The exacting nature of medical work, with its constant association with distressing details of ill health, seems to direct the mind in hours of relaxation to the artistic side of life. At any rate this seems the most natural explanation of the fact that so many medical practitioners collect artistic treasures. To such, home life in an atmosphere of artistic taste affords both interest and relaxation.

THE CHOICE OF A CAR

It is difficult to realize in these days how rapid has been the development of the motor car. Yet there are still plenty of practitioners who, having started practice with horse and trap, or the more dignified brougham, and endured the trials and uncertainties of the early days of motoring, can enjoy the more the convenience and cheapness of the modern efficient motor car. To such it may well seem that the problem of choosing a car is no problem at all, but rather the choice from a superabundance of excellence. It only remains for the practitioner to decide how much he can afford to pay for the essential means of transport. Whether or not he be strictly limited to the lowest capital outlay or whether he can afford to indulge his fancy for something more luxurious, there are certain requirements which should govern his selection. The first point is to make sure that the car he chooses is one in which he can really sit at ease for long periods. This is the more important if he happens to be unusually tall or differs in some other way from the normal standard to which most cars are made. Petrol consumption is important, but the problem of tyres is no longer significant, since tyres and roads in these days are as near perfect as can be. Ease of starting and reliability are most important. A bad starter is a constant source of irritation in cold weather or at night, and nothing is more exasperating than to be held up by minor troubles which wreck a busy time-table. Where traffic is dense, and this is generally the case, quickness of acceleration is of the greatest convenience.

With these major considerations in mind there lies a wide choice of excellent cars at any price from a little over a hundred pounds upwards. If the doctor has a considerable mileage to cover in the year, and this applies to all except those whose area of practice is unusually confined, it will save time and trouble and add little to his annual outlay if a contract is made to have a new car every year.

THE CONSULTING ROOM

The consulting room is the centre of the practitioner's professional life. The bedside of his patient is the place where he will learn to detach his mind rapidly from extraneous thought and concentrate on the immediate case before him, as indeed he will do in his own consulting room, but in the latter he will find his surroundings insensibly a help to his most thoughtful moods. However much the general details of fittings and furniture of all consulting rooms may bear resemblance, it may truly be said that the consulting room reflects the practitioner who uses it.

Consciously or unconsciously he will impress his personality on his environment.

In general it may be said that the consulting room should inspire the patient with a sense of quiet and repose, and the less it is obviously a consulting room, and the less in evidence the machinery of technical equipment, the better. Whenever possible the examination room should be a smaller room apart or at least a part of the consulting room screened from view. The sight of cases of instruments and mechanical apparatus is not calculated to set the patient's mind at rest, least of all to inspire him with a sense of the doctor's importance. The arrangement of the light should also be a matter of consideration. All that is needed is a good light on the patient and on the papers before the doctor. Subdued light elsewhere is sufficient, and of course a comfortable seat, and proper temperature should be provided. The more ordinary instruments for examination purposes can easily be at hand and out of sight.

THE WAITING ROOM

The doctor's, like the dentist's, waiting room has long been a valuable source of copy to the professional humorist. The invitation to the unhappy patient while awaiting his turn for an interview with his medical adviser to address his attention to back numbers of *Punch* is the kind of joke which lends itself to frequent repetition in various guises. The criticism is not unmerited, for sufficient regard is not generally paid to the psychology of the waiting patient. In private life pains are taken to usher the waiting guest in to the best room in the house. Unconsciously it is recognized that, while waiting, his thoughts are of his host, and it is wished he should think well of him. The last thing that should be done is to leave out-of-date literature in such a place. It is well worth while therefore ensuring that the waiting-room is worth waiting in. There is perhaps no better place for educating the public in medical matters than the doctor's waiting room. It is only necessary to direct the attention to suitable literature which is likely to awaken interest in this direction, and books and pamphlets of subjects having a bearing on health questions are plentiful and do not become out-of-date in a short time. The practitioner should give some thought therefore to the furniture and literature of the waiting room. Remember also to provide something to interest a child. An anxious mother waiting with a child will be grateful for something to occupy the infant mind.

MEDICAL AND SURGICAL APPLIANCES

Every practitioner will know for himself his general needs for the equipment of his premises. When it comes to the outfit that he must carry with him on his rounds, there is great scope for individual choice and method. Every doctor seeks in the main to save his time and study convenience in this respect, especially in a country practice where it is not easy to rectify omission by returning home for something he requires. Experience of country practice of a mixed kind for some thirty-five years may therefore be worth recording on this point.

The stethoscope.—The most convenient type to carry is the binaural folding instrument with light composition arms carrying the chest piece which is the particular choice of the individual. A loop of strong tape about four inches long should be sewn from the seam of the waistcoat above the left armhole for about two inches down. This leaves a loop into which the folded arms of the instrument readily hook. The other end will pass into the trouser pocket of the same side. Thus carried the wearer will hardly be conscious of its existence.

The rest of the equipment will be carried in the car. All sorts of bags and cases for this purpose are on the market but it is very convenient to have separate bags for special purposes. *The midwifery bag* is a thing apart. Its make-up is standardized and can suit individual taste. The other bags are those which may or may not be required at any moment.

Throat, nose and ear.—Nothing is more important than to be able to get a good view of these parts with as little inconvenience to the patient as possible. Often a pocket torch is sufficient for the purpose, but not infrequently it is a great convenience to have both hands free. The practitioner should therefore carry a spectacle frame with light attachment. If he is lucky enough not to need glasses, the frame alone will be sufficient. A small ever-ready battery will last for months without replacement. Tongue depressor, nasal and aural specula and laryngeal mirrors, ear syringe and metal ear-tray complete the outfit. There are also carried throat swabs for examination purposes. It is also very useful to have a pair of forceps of the crocodile pattern always at hand. Foreign bodies in the throat, ear and nose demand prompt treatment.

Hypodermic outfit.—With the ever-increasing use of hypodermic medication and vaccines a special case for this purpose will save much time and inconvenience. After fruitless effort to find the ideal case, I designed one for myself. This has proved so successful that it is described here as made to order by Messrs. Down Bros. It can be adapted readily to suit individual requirements. On a flat support which lifts easily from a compartment in the case are fixed in metal spring clips the following articles:—

A hypodermic syringe of the long thin type in spirit and metal case. This is graduated in minims and cubic centimetres and has a detachable metal stand. Two glass bottles in metal cases containing respectively methylated and rectified spirit.

A battery of spare needles.

A metal case in which are kept every kind of emergency tablets, morphine, strychnine, hyoscine, atropine, and so forth.

A small metal spirit-lamp, and a metal tube for surgical needles used for vaccination.

The latter may be omitted if but rarely required, and in place of the battery of spare needles a syringe into the plunger of which is fitted a spare needle may be used. The depth of the leather dispatch case in which this tray fits is two inches. The rest of the case affords a compartment in which can be packed a compressed packet of cotton wool, and such vaccines and drugs as are in frequent use. The size of the case can be as much more than is necessary to carry the minimum outfit, as is desired. The convenience of this case is that all that is needed for hypodermic medication and emergency treatment is ready for use and always at hand. For minor surgical work and the dressing of wounds a special bag or case is recommended. It is useful to keep at home a bag for anæsthetic work of a simple character, and it is generally wise to carry in the

FIG. 4.—The author's fitted case containing hypodermic outfit.

car a blood-pressure recording instrument.

With this outfit in the car as separate articles, or more or less combined in a common containing arrangement, the practitioner is unlikely to regret leaving at home something required on his ordinary round.

There only remains, at present unprovided for, the need of the dispensing doctor in a scattered district for some convenient method of carrying the material for simple dispensing in his car, such as his predecessors a hundred years ago and more carried in those delightful little drug chests which may now be seen in the windows of antique dealers' premises.

Case records.—An important item in the consideration of a doctor's equipment is that which relates to the keeping of records of his patients. Here again there is an abundant choice of case-books for use both in visiting and consulting-room practice. The loose-leaf and card-index types are the most useful. However much reliance is placed on memory and a temperature chart record in the patient's house, it is most important to acquire the habit of taking case notes of the patient who comes to consult the doctor more or less regularly. Whatever system is used it should allow the attachment of letters, reports and the like with the minimum inconvenience.

National Health records.—The keeping of these records is part of the insurance practitioner's contract. He is paid to do it, and sooner or later he will have his records inspected by a medical officer of the Ministry of Health, and the manner in which he carries out this particular work will be noted. The administrative side of a doctor's practice is always irksome to the busy man who is hard pressed to get through his day's work, and it must be admitted that his training has not been much help to him in this respect. Nevertheless, in the advancing complexity of medical practice, and the increasing concern of the state and local health authorities in the public health, the administrative duties of every doctor increase and now form a recognized part of his work. To minimize this unpleasant side of general practice, and at the same time carry it out efficiently, it is worth considering seriously the best method to employ. Strict method and routine will in the end save time and inconvenience.

The records of panel patients are of standard form, and many kinds of containing cabinets are specially designed to hold them. Every visit, consultation and certificate issued must be entered together with brief clinical notes and diagnosis. The usual plan is for the doctor to keep them in his consulting room at hand and to make entries at the time when consulted. At daily or less frequent intervals, visits may be entered up from the visiting list. In some practices, especially where large numbers are dealt with and there are several partners concerned, the records are all filed by a dispenser or secretary who hands the record to each patient before he is seen by the doctor. These are collected and replaced by the same agent. This is a distinct saving of time and trouble to the practitioner, but has the disadvantage of revealing to the patient the record that is made, and it is preferable to arrange for the required cards to be placed in a pile on the doctor's table before-hand, and afterwards replaced by an assistant. Whatever system is used, method must be the keynote. Neglect in keeping the required notes will most certainly come to light to the discredit of the doctor concerned. Finally, to those insurance practitioners, and they are many, who criticize the system as unnecessary, irksome and leading to no practical result, it is well to repeat the inevitable answer of the powers that be. "You have contracted to do it, you are paid to do it, and if you seriously wish to be relieved of the duty, a reduction of the capitation fee by some such amount as sixpence, is the alternative."

PRACTICAL NOTES

PROTAMINE-ZINC-INSULIN

Scarcely have investigators in this country begun to comment on the clinical use of protamine-insulin for the treatment of diabetes mellitus than a still further improvement is announced from Montreal by I. M. Rabinowitch and colleagues (*The Canadian Medical Association Journal*, September 1936, xxxv, 239). It has been found that the addition of zinc to the protamine-insulin mixture in the strength of 1 mgm. of zinc per 500 units of insulin, carefully buffered to produce a final mixture with the same hydrogen-ion concentration as blood, is of even greater value than the protamine-insulin alone. A much more prolonged action on the blood sugar is obtained and it is estimated that approximately 25 per cent. less insulin is required than even with the protamine-insulin suspension. The use of zinc was not altogether fortuitous and it is believed that this metal not only is found in large quantities in the pancreas, but possibly enters into the composition of normal insulin. The general effect seems to be to slow down the action of injected insulin and the evidence so far available indicates that this is a valuable advance in the management of diabetes.

DIET IN NEPHROSIS

The principles of dietetic treatment in the type of kidney disease generally known as nephrosis and characterized by massive albuminuria and generalized œdema differ in some important respects from those applicable to other types of kidney disease. R. Platt (*The British Medical Journal*, September 12, 1936, ii, 548) puts forward the following diet as fulfilling the necessary restrictions of salt and water together with a liberal supply of protein and a minimal quantity of fat such as has been found worth trying at intervals in the treatment of the disease.

Breakfast.—5 oz. tea or coffee with skimmed milk. 4 oz. fish. Bread. Marmalade.

Mid-morning.—One small orange or apple.

Lunch.—Oysters if procurable. 4 oz. lean meat or chicken. Peas, beans, or lentils. Milk pudding. 3 oz. fluid.

Tea.—5 oz. tea with skimmed milk. 2 oz. fish or lean meat. 6 oz. salad or fruit.

Supper.—4 oz. fish or lean meat. Vegetables, salad, or mushrooms. 5 oz. tea or coffee with skimmed milk.

No salt to be cooked or eaten with the food. No extra fluid.

It is suggested that this should be taken for a month or two at a time and in the intervals an ordinary diet ordered but with the fluid content restricted to about one pint per day for an adult and all salt or salted food excluded. This dietetic treatment must, of course, be combined with other measures.

THE TREATMENT OF CONSTIPATION BY ENDOCRINES

R. Pugliese (*Minerva Medica*, July 28, 1936, xxvii, 83) has experimented with sixteen cases of chronic constipation by means of injection of posterior pituitary and suprarenal extract called "astheno-glandulin" given intramuscularly. By this means in eleven cases, either atonic or spastic, a lasting effect was produced, and in the remaining five cases the effect was uncertain or negative. In favourable cases a first injection of 0.5 c.cm. was sufficient for the most part to regulate the bowels for a week and the subsequent injections had an action of which the duration was progressively increased. In three cases, however, a single injection had a permanent action without the necessity of going further. The author's explanation is that the hormones injected modify the vago-sympathetic equilibrium in such a way as to cause an optimum tone in the intestinal muscle so that it can regularly respond to the physiological stimulus caused by the presence of the fæcal mass in the colon. A condition favourable to its action is a low blood-pressure. The best results were obtained in women who were " below par," dyspeptic and with a suspicion of tuberculosis in such condition as to lack that physiological stimulus which causes a regular evacuation of the bowel.

INTRAVENOUS PITUITRIN IN LABOUR

The use of pituitrin given intravenously in the third stage of labour to reduce the degree of bleeding is the subject of a careful analysis by J. B. Pastore (*American Journal of Obstetrics and Gynecology*, August, 1936, xxxii, 280) who particularly stresses the importance of adequate dilution and slow administration. Actually the total amount used has, in the course of the past few years, been reduced from 0.5 c.cm. to 1.5 minims of surgical pituitrin (20 units) diluted in 2.5 c.cm. of normal saline. Such dilution has been prepared daily by adding 1 c.cm. of pituitrin to 24 c.cm. of saline. The injection is given slowly into a vein and reactions were only induced in five out of ninety-six cases. Excessive bleeding due to atony of the uterus was definitely controlled by pituitrin used in this way and it is suggested that no other route is of any value in this condition because of the delay in action while absorption takes place.

GLYCINE FOR THE HEART MUSCLE

Although there is considerable difference of opinion as to the value of glycine (glycocoll) in various forms of muscular dystrophy it is still popular in certain centres, notably in Germany. S. Kalter (*Deutsche medizinische Wochenschrift*, August 21, 1936, lxii, 1371) now recommends the use of this substance in certain affections of the heart muscle claiming that in certain types of heart failure there is a similar interference with the function and chemistry of the heart muscle as is present in the systemic muscle in cases of muscular dystrophy. Case records are given for which doses of glycine amounting to 15 mgm. daily have produced, usually towards the beginning of the second week of treatment, some definite improvement both as regards symptoms and the objective findings of pulse rate and blood pressure. It is suggested that possibly the association of glycine with muscle extracts or certain hormones might produce even better results.

INTRAVENOUS ANTITOXIN FOR MENINGITIS

Since the introduction of Ferry's antitoxin there has been a definite advance in the treatment of meningococcal meningitis, but according to A. L. Hoyne (*The Journal of the American Medical Association*, August 15, 1936, cvii, 478) the intraspinal route for such a serum is undesirable since it commonly produces irritation. This may actually cause prolongation of the disease or in the early septicæmia stage may determine a meningeal involvement which might otherwise have been avoided. Hoyne therefore recommends that massive doses of the antitoxin should be given intravenously. It is best diluted in ten per cent. glucose in normal saline to at least twice the total volume of serum required. From five to fifteen minims of adrenaline are added to the mixture which is then allowed to drip into the vein at about one drop per second. The initial dose recommended is 50,000 to 100,000 units, the smaller quantity for a child, the larger for an adult. Subsequent dosage will depend upon progress. At first lumbar puncture was combined with this method of treatment on one or two occasions, but more recently patients have been treated without any lumbar puncture at all with a low mortality rate. The diagnosis in such cases was made by an early blood culture.

THE TREATMENT OF OZÆNA

The causation of ozæna is attributed to various factors by various authors and the treatment recommended is also very variable both in extent and success. Z. Chéridjian and T. Sciclounoff (*La Presse médicale*, August 12, 1936, xliv, 1290) claim that a vascular factor is of importance and, in fact, sympathectomy of the carotids has been used as a successful if temporary and somewhat drastic method of treatment. Acetylcholine is advocated as producing a similar effect upon the arterioles and it has therefore been utilized in the treatment of ozæna with good effect. A freshly prepared solution with 10 cgm. of acetylcholine in 2 c.cm. of sterilized distilled water is used. This is apparently then applied locally by means of a syringe under the mucous membrane after this has been carefully cleared of all crusts and also after a preliminary injection of 10 per cent. lactic acid. Two such "treatments" are given each week and the results of nine cases presented in detail show five cures and three considerable improvements.

THE TREATMENT OF PSYCHONEUROSES

In a recent contribution to the series on the therapeutics employed at the Cook County Hospital edited by B. Fantus, S. H. Kraines (*The Journal of the American Medical Association*, August 22, 1936, cvii, 579) has collaborated in an account of measures to be adopted in the treatment of psychoneuroses. The treatment can be summarized under the headings (1) Proper care of physical defects;

(2) Changing the patient's personality; (3) Lessening environmental strain as much as possible. In each of these three main divisions there may be indications for medicinal treatment. For example bromide is valuable to lessen excessive nervous irritability or some other sedative such as luminal to deal with insomnia. Such drugs, however, must be presented to the patient with the frank instructions that they are merely adjuncts to break in on a vicious circle and the same principle also governs the use of cathartics. Dietetic adjustments may be necessary and it is recommended to impress upon the patient the importance of eating everything rather than developing special fads and fancies. Hydrotherapy may be useful for its soothing effects, and correction of surgical defects has to be approached with great care. Apart from all such measures a change in the patient's personality has to be regarded as the focal point of the whole therapy programme. Frank acceptance of the existing personality, substitution therapy, sex hygiene, proper habit formation and occupational therapy are some of the measures to be considered. Finally adjustments in the patient's surroundings are important in order to lessen the environmental stress.

THE BULGARIAN TREATMENT FOR POST-ENCEPHALITIC PARKINSONISM

C. Agostini (*Il Policlinico*, June 6, 1936, xiv, 1244) draws attention to this treatment instituted by Prof. Panegrossi, which has to some extent superseded that by belladonna, stramonium and scopolamine. It consists principally in the administration of a decoction of the roots of certain solanaceous plants coming from Bulgaria. Its beneficial effects are noticeable even in reduced progressive dosage in the resolution of muscular rigidity, cessation of ptyalism and recovery from psychic inactivity. A special ward has been opened in the Polyclinico at Rome for the treatment of such patients. It is necessary to test the individual tolerance of such patients, especially in the early periods by giving every morning and evening a few c.cm. of the decoction up to 30 c.cm. with a vegetarian diet, warm baths and electro-therapeutic massage. The subjects studied by the author are comprised in three groups: (1) those who suffer from a premonitory "brady-psychism"; (2) those affected by psychomotor lethargy; and (3) those who besides post-encephalitic disturbances have a psychopathic condition. The treatment seems to take precedence over all others by securing to the patients lasting advantages.

NEW CHLORINE SOLUTIONS FOR SURGICAL INFECTIONS

The value of chlorine solutions in surgery received abundant confirmation during the war, but there has been, from time to time, considerable discussion as to the advantages and drawbacks of Dakin's solution. F. Young (*Surgery, Gynecology and Obstetrics*, September 1936, lxiii, 318) has undertaken a complicated investigation of a new chlorine compound called azochloramid which is considered to offer many advantages. It is highly bactericidal and probably the least irritating chlorine compound so far proposed. Groups of cases have been treated with various solutions and efforts made to determine the advantages of azochloramid in patients who had been operated upon for kidney lesions. The wounds remained uninfected in seven cases treated by filling the drainage tube daily with azochloramid in triacetin (1 in 500) while in a control series, three out of ten cases alone remained clean. In the treatment of empyema saline solutions of azochloramid in concentrations of 1 in 2000 (as an average) used for irrigation produced healing in about half the time taken in controls irrigated with Dakin's solution. Infected post-operative abdominal wounds have been packed with gauze moistened with 1 in 500 solution of azochloramid in triacetin changed every twenty-four hours with again a considerable reduction in the time of healing. No untoward results of any consequence have been observed with the new compound.

NITROGLYCERINE FOR NIGHT-BLINDNESS

Although the cause of defect in adapting, or an inability to adapt, the faculty of vision to faint illumination is somewhat variable, it is apparently agreed that spastic conditions of the retinal blood-vessels are not infrequently found. Accordingly R. de R. Barondes (*The British Journal of Ophthalmology*, September 1936, xx, 528) recommends the use of vasodilator drugs to relieve the spasm. In five adult cases it was found that after the administration of nitroglycerine (0.003 to 0.06 gm.) given in coated tablets the sensitivity of the eyes gradually increased and after five to ten minutes patients could move about a darkened room. Care must be taken in the use of nitroglycerine and if actual degenerative changes are present in the walls of the arteries no benefits can be expected. It is suggested that proper doses of the vasodilator drugs might be administered to those working more or less continuously in the dark and to whom it is especially important to be able to see in darkness, such as spies in war-time, navigators and aviators who do night-flying.

POSTURE AND PHYSIOLOGICAL EFFICIENCY

The study of the physiological changes produced by correction of posture in eighteen healthy subjects with defects of the kypholordotic type suggests, according to L. B. Laplace and J. T. Nicholson (*The American Journal of the Medical Sciences*, September 1936, cxcii, 345) that significantly beneficial effects on circulatory and respiratory function can be obtained in the majority of cases. Investigations of the position of the heart, of the diaphragm, cardiovascular efficiency (estimated from blood pressure and pulse rate readings), of the vital capacity, and other respiratory measurements, show that the assumption of a correct posture leads immediately to improvement in these various factors. All individuals, however, are not similarly benefited and full correction of posture is sometimes unfavourable to maximum physiological efficiency. Too rapid change from a poor to a corrected posture is also likely to be fatiguing and to obscure the benefit otherwise derived.

REVIEWS OF BOOKS

Diseases of Infancy and Childhood. By WILFRID SHELDON, M.D., F.R.C.P. With a Foreword by G. F. STILL, M.D., F.R.C.P. London: J. & A. Churchill, Ltd., 1936. Pp. x and 738. With 137 illustrations. Price 21*s.*

ADVANCES in pædiatrics have been many in the past few years and there was room for a new textbook on this subject of a type which could be used both by students and post-graduates. Dr. Sheldon is to be sincerely congratulated on his work in covering the whole field in just over seven hundred pages and in his wise proportioning of the text as regards common maladies and those rarities for which a few explanatory lines are all that need be included. In his illustrations also the author's choice has been judicious and his mongol baby is of much more help than the usual picture of an older child thus afflicted. (Perhaps he would find a corresponding picture of a very young cretin for the next edition.) The book begins with an excellent introductory chapter on the examination of children, full of good advice and yet leaving the individual practitioner to devise his own exact plan of campaign. Then follow chapters on the new-born and the premature infant before Dr. Sheldon plunges into the difficult subject of diet from which he emerges with great success. It is in keeping with the modern spirit of the book that dilute milk mixtures are quickly left behind and whole milk advocated from six months of age onwards. The principal disorders of children then form the chapter headings for the rest of the volume which concludes with a full index. Dr. Sheldon's style of writing is easy to read and concise. It is stated that lectures to students and others have been incorporated and there is evidence of this exacting type of exposition in the presentation of difficult subjects, such as in the sections on "acidosis" or on tuberculosis in childhood. Mr. James Crooks has contributed a short section on disorders of the accessory sinuses and Dr. G. F. Still a pleasantly phrased foreword in which he heartily wishes Dr. Sheldon's book success. On its merits this is undoubtedly assured and the publishers must be congratulated not only on their usual high standard of production but upon their wisdom in selecting this particular author for this particular subject.

Paget's Disease of the Nipple, and its Relation to Surface Cancers and Pre-cancerous States in General. By KEITH INGLIS, M.D., CH.M. Oxford University Press. London: Humphrey Milford, 1936. Pp. xii and 233. Illustrations 237. Price 36*s.*

IN 1874 Sir James Paget gave a clinical description of "disease of the mammary areola preceding cancer of the mammary gland," which has often been called Paget's disease or eczema of the nipple, and has aroused much interest, especially about the relation of the cutaneous change to the scirrhous carcinoma of the breast. The Professor of Pathology in the University of Sydney has now brought out a most complete monograph on this subject, which must long remain a valuable source of reference, for not only is existing work well summarized but extensive investigations have been carried out, as is shown by the illustrations which are as numerous as the pages. He concludes that Paget's disease is neoplastic from its start, and is a surface carcinoma which commences at the junction of a lactiferous duct with the epidermis, or in a lactiferous duct near its outlet, and spreads, without forming any definite nodule, over the nipple and downwards into the ducts and acini of the mamma, the so-called "Paget cells" being carcinoma cells. The occurrence of Paget's disease in parts of the body other than the mammary areola, such as the umbilicus and the glans penis, is critically considered, but only one of the collected cases conforms to the author's description of the changes in Paget's disease of the nipple.

Diseases of the Testicle. By HAMILTON BAILEY, F.R.C.S. London : H. K. Lewis & Co., 1936. Pp. v and 166. Illustrations 129, of which 10 are coloured. Price 12*s.* 6*d.*

THIS is a thoroughly practical, clearly written, and admirably illustrated handbook. After a description of the descent of the testes, chapters are devoted to the results and surgical treatment of imperfectly descended testes, and reasons are given why the operation of temporary implantation into the thigh should be known as the Keetley-Torek rather than the Torek operation. The chapter dealing with acute inflammation is headed epididymo-orchitis because it is unprofitable and confusing to attempt to segregate epididymitis from orchitis; thus evidence is quoted to show that the epididymis shares in the orchitis of mumps, which in 55 per cent. of the cases is followed after eighteen months to two years by serious, if not complete, atrophy. The section on new growths is finely illustrated, and is followed by chapters on functionally imperfect testes and on rejuvenation; the Steinach operations 1 and 2 and testicular grafting are described, and the comment is made that true progress has been retarded by extravagant claims and publicity in the lay press.

Principles and Practice of Recreational Therapy for the Mentally Ill. By JOHN EISELE DAVIS, B.A., M.A., in collaboration with WILLIAM RUSH DUNTON, JR. London : William Heinemann (Medical Books) Ltd., 1936. Pp. xviii and 206. Price 15*s.*

ACCORDING to a dictum of John Dewey, learning is best established by doing, and this book, introduced by Adolf Meyer, is an attempt to set out what can be done by recreational therapy for the special needs of the mentally ill. The writers have had much experience in directing the daily programme of hundreds of psychotic and neurotic patients for many years and this they set out together with sections on disease entities, tests (psychological and physiological) and outlines of training courses for nurses, attendants and others. A glossary is wisely included for the reading matter is not always easy to follow. This somewhat neglected subject should benefit by the publication of this comprehensive volume.

Favourite Prescriptions. Edited by SIR HUMPHRY ROLLESTON, Bt., G.C.V.O., K.C.B., M.D., F.R.C.P. and ALAN A. MONCRIEFF, M.D., F.R.C.P. (*The Practitioner* Handbooks). London : Eyre and Spottiswoode, Ltd., 1936. Pp. 227. Price 10*s.* 6*d.*

THIS volume collects the contributions under this heading which appeared in *The Practitioner* over a period of eighteen months. It consists therefore of informative reviews of the official pharmacopœias of leading hospitals in the British Isles together with a discussion of prescriptions commonly in use at institutions where no pharmacopœia exists and, in a final article, an account of the " National Formulary." Practitioners who enjoyed the contributions as they appeared will no doubt wish to possess them in collected form, especially as an excellent index adds greatly to the value of the articles. The general style of printing and binding is of a high standard, and the volume would make an excellent Christmas gift to a fellow practitioner.

NEW EDITIONS

Williams' Obstetrics, by HENRICUS J. STANDER, M.D., F.A.C.S. (D. Appleton-Century Co., 40*s*.) in its seventh edition is a complete revision and enlargement of the text originally written by the late J. Whitridge Williams who died in 1931, one year after he had completed a thorough revision of his textbook for the sixth edition. The general plan remains unchanged although three new sections have been added (on hormones, on urinary complications and on anæsthesia and analgesia) and the teaching is still essentially that of the Johns Hopkins Hospital. Many excellent new illustrations have been added and the whole production maintains the high standard set by its original author.

The Principles of Bacteriology and Immunity, by W. W. C. TOPLEY, M.A., M.D., M.SC., F.R.C.P., F.R.S., and G. S. WILSON, F.R.C.P., D.P.H. (Arnold, 50*s*.) is the second edition of a valuable textbook which has proved its worth as a standard work of reference since it first appeared in 1929. There have been extensive alterations made in the process of revision and although the original arrangement of the text remains essentially unaltered there is evidence of much re-writing and several additional chapters have been introduced. The two volumes of the original production have now been combined into one, a distinct advantage for a work of this type. The rapid advances of bacteriology in the past seven years are well reflected in its pages.

Food and the Principles of Dietetics, by ROBERT HUTCHISON, M.D., LL.D., F.R.C.P., and V. H. MOTTRAM, M.A. (Arnold 21*s*.) now appears in a new edition—the eighth—at a shorter interval than ever before, which is a sufficient reflexion of present-day interest in the whole subject of nutrition. The work needs no introduction; it is, indeed, a standard volume of reference. The main alterations in the new version deal with the fundamental principles of dietetics and a new section dealing with the history of dietetics is reproduced from *The Practitioner*.

Clinical Handbook, by members of the Staff of St. Vincent's Hospital, Sydney and edited by V. M. COPPLESON, M.B., CH.M., F.R.C.S., and DOUGLAS MILLER, F.R.C.S., F.R.A.C.S. (Angus and Robertson, 6*s*.) in its second edition has been carefully revised, partly re-written and completely brought up to date with the addition of several new sections. Designed essentially for residents, nurses and students this modest volume is packed full of detailed information not easily found collected together in such a compact manner. Experts have dealt with the procedures in the special departments.

NOTES AND PREPARATIONS

INCIDENCE OF DEAFNESS

The following letter has been received from the secretary of the National Institute for the Deaf:—

Sir,

We are endeavouring to obtain information on the incidence of serious deafness in youth and adult life, or that degree of deafness which makes conversation either difficult or impossible and may lead to the loss of employment.

So far as we know, no figures relating to the whole population are available in this or any other country: but it has been suggested to us that possibly some of your readers may be able to give us useful information on this subject concerning particular areas, groups or trades.

If so, we shall be very grateful for any information on the incidence of serious deafness even if it refers only to limited numbers of persons, or for any direction to the sources of such information whether at home or abroad.

Yours very truly,

(Signed) A. J. STORY.

Replies should be sent to the Headquarters of the Institute, 105 Gower Street, London, W.C.1.

ADDENDUM 1936 TO THE BRITISH PHARMACOPŒIA 1932

Advance copies of the Addendum 1936 to the latest " B.P." are now available for inspection (but not yet for sale) at the office of the General Medical Council, 44 Hallam Street, London, W.1 and at the offices of the Scottish and Irish Branch Councils. This Addendum alters and amends the B.P. 1932 by the deletion of one article (that on irradiated ergosterol replaced by a new monograph on calciferol), by the addition and revision of the whole or parts of certain other monographs and by certain important changes in standards adopted for various substances, of which certain adjustments in the official standard for digitalis should be especially noted. Notice of the publication of this Addendum will be given in the official gazettes on the 29th December and copies may then be obtained at the price of 5s.

NEW PREPARATIONS

AMPHYL Antiseptic, manufactured by Lysol Ltd., Raynes Park, London, S.W.20, is a solution of chlorhydroxymetaxylene and it is claimed that in bactericidal value, penetrating power and low toxicity it represents an advance in antiseptics. A brochure giving the results of laboratory tests is available for practitioners.

PLANACRINE Antiseptic Lozenges are claimed to have powerful bactericidal properties and being free from irritating effects on mucous membranes they are especially suitable for use in infected conditions of the mouth and nose. Pocket tins of 40 lozenges are issued (price 1s. 6d.) by Pharmaceutical Specialities (May & Baker) Ltd., Dagenham.

(It is regretted that a new product also issued by this firm and called " LEUCARSONE " was mis-spelt in last month's issue).

RYZAMIN-B.—This is a concentrated extract of vitamin B obtained from rice polishings and stated to have a potency of not less than 50 international units of vitamin B per gramme. It is issued by Burroughs Wellcome & Co. in collapsible metal tubes of half-an-ounce from which the daily dose may be easily measured in the special spoon provided. The sample supplied was of pleasant flavour.

INSULIN-BOOTS

A new booklet entitled " Insulin-Boots in the Treatment of Diabetes Mellitus " has recently been issued and copies may be obtained by application to the Wholesale and Export Department, Boots Pure Drug Co., Ltd., Station Street, Nottingham. This well-produced publication deals with the history and properties of insulin and gives details on the methods of diagnosis and treatment of diabetes.

ENERGEN DIETARIES

Energen Foods Co., Ltd., Energen Works, Bridge Road, Willesden, London, N.W.10, now offer a series of cards by which medical practitioners can secure the standard diet charts issued by this firm or specially planned dietaries for individual patients. Arrangements can also be made for panel patients and others whose financial circumstances do not permit of their paying the full retail price of Energen products to obtain supplies at a reduced rate. A new " Dictionary of Dietaries " is also available for the medical profession.

OXYGEN ON TAP

What is described as the most comprehensive system of oxygen distribution in any hospital in this country has recently been completed at the Royal Free Hospital. A system of pipe lines totalling 3,000 feet in length supplies oxygen at low pressure to taps near each group of beds. A central storage is provided in the porter's lodge, consisting of a rack of six oxygen cylinders, each containing 150 cubic feet. A series of controls and reducing valves are arranged, together with a buzzer-light signal to indicate that a cylinder requires changing. High-pressure pipe lines are carried outside the building to points at which they enter the wards. Here a special reducing valve brings the pressure down to 20 lb. per square inch. The advantages of such a system will be obvious to those concerned with either the treatment of patients or the general management of a hospital. The installation here described was carried out by The British Oxygen Co., Wembley, Middlesex, to the design of Messrs. Richards & Bright, Consulting Engineers.

ASBESTOS FABRICS

It has recently been possible to colour and " finish " asbestos in such a way as enables it to rank with other textile material, and at an exhibition in London a large number of asbestos cloths have been exhibited. There is an obvious application of this fire-resisting material for hospitals—as curtains, blankets or rugs for example. The exhibition was organized to display goods of this variety manufactured by Bell's Asbestos and Engineering Supplies, Ltd., Slough, Bucks.

THE PRACTITIONER

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THE TREATMENT OF URÆMIA

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THE name uræmia was introduced about a hundred years ago when the alarming and dangerous phenomena which are liable to develop in the course of Bright's disease were believed to be due to poisoning by retained urea. Although this theory is no longer held, the diagnosis retains its usefulness since no better term has been proposed. Uræmia has been defined as a toxic state which may appear in any kind of serious disease of the kidneys. This definition, though lacking preciseness, has the advantage that it rules out such conditions as cerebral hæmorrhage or thrombosis, hypertension, and heart failure which may complicate long-standing nephritis. Uræmia in this broad sense is a very protean condition and its clinical features vary enormously from case to case. The kidney possesses many physiological activities and when severe damage involves the organ the functions may fail in different order and in varying degree. Advances in biochemical investigations have done much to improve the knowledge of the subject. It is now possible to distinguish different types of renal failure. The convulsive seizures and coma of acute nephritis form a syndrome quite distinct from the toxic phenomena of advanced Bright's disease, and the clinical state which follows complete anuria is different from both of these. Acute convulsive uræmia is characteristic of the hydræmic type of renal disease, and as it appears to depend on an entirely different mechanism there is a tendency to exclude it from the subject of uræmia. Azotæmic nephritis may show a miscellaneous collection of symptoms which are usually known by the name true or retention uræmia. The two groups of symptoms sometimes occur together. It would seem best to include both under the general term uræmia and distinguish them by a qualifying adjective.

Uræmia of either type must be regarded as a serious complication for it often precedes death. The prognosis, however, is not always bad; it depends to a great extent on the amount of damage the kidneys have previously sustained. Young individuals with acute nephritis often recover completely from uræmia, even when there has been coma and severe fits, whereas convulsive seizures in older people are much more serious. The outlook in the true retention uræmia of advanced nephritis is much more grave, since the toxic symptoms imply that the last reserves of the kidney have been encroached upon. The results to be expected from treatment will depend on many factors and will vary in different individuals. In spite of the vast amount of study and research on the subject, uræmia remains much of a mystery and consequently therapy is to a large extent traditional.

CONVULSIVE URÆMIA

Acute convulsive uræmia usually occurs in acute nephritis or during an acute exacerbation in the course of a long-standing case. It is common in the hydræmic type of Bright's disease when there is oliguria, salt and water retention, and a certain amount of œdema, though the visible anasarca may be slight. The constant association with this type of case and the fact that the cerebrospinal fluid is under pressure suggest that the immediate cause of the symptoms is œdema of the brain. The theory is not undisputed. It is said that post-mortem examination does not always show a wet brain in a patient who has suffered from convulsions. It is known that fits can be produced by other means—for example, by various toxins and drugs. Again, it must be admitted that convulsive seizures do not occur in cases of gross œdema from other causes. In these gravity plays an important part, whereas in nephritis the fluid is much more uniformly distributed. It is interesting to recall that in recent years a similar mechanism has been postulated for the seizures in certain types of idiopathic epilepsy. Water retention can be produced in such patients by inducing them to drink large quantities of fluid after the administration of pituitrin which has the effect of inhibiting urinary secretion. Under this procedure an epileptic who has only infrequent seizures may be made to have an attack of grand mal. The recognition of water retention in convulsive uræmia gives definite indications for treatment. Patients with convulsive uræmia show no gross retention of nitrogenous substances or of phosphates in the blood such as occurs in " true " uræmia, and clinical tests in them show little impairment of renal function.

The principal features of this uræmia are convulsions and loss of consciousness. Severe headache may precede or follow the fits. Transient involvement of the special senses, local palsies or some muscular rigidity may also be present. The fits may be single and slight, or severe and repeated so often as to suggest a diagnosis of status epilepticus.

Treatment.—The possible onset of convulsive uræmia should be kept in mind in all cases of hydræmic nephritis. Adequate treatment of the primary disease should do much to avoid the development of this dangerous complication. It is important to watch the urinary output closely, for a reduction in quantity may precipitate an attack of convulsive uræmia. Attempts must be made to limit the anasarca by favouring excretion of fluids by such alternative channels as the skin and bowel, and by restricting the intake of fluid to an amount that the patient can deal with satisfactorily. Free action of the skin should be obtained by nursing the patient in a warm blanket-bed with several hot bottles. Hot packs or hot-air baths may be given from time to time to favour sweating. The bowels must be kept freely open by a daily dose of magnesium sulphate or compound jalap powder. The diet should be such as to throw as little strain as possible on the kidneys. Salt is best restricted to some extent. It is now believed that the sodium ion is more important than the chloride in producing and maintaining anasarca. Sodium chloride aggravates œdema, potassium chloride has no effect on it, while calcium or ammonium chlorides are diuretic. Other sodium salts can lead to accumulation of fluid in the body, and the bicarbonate or bromide should be used with care when œdema threatens.

When convulsions have actually developed, prompt and energetic measures are necessary. Care must be taken to prevent the patient hurting himself. If the fits are very violent, a dose of morphine should be given at once and chloroform may be administered intermittently until the opiate has come into action. Later, chloral may be given to damp down the nervous system and prevent recurrence. Such measures are often helpful but do not strike at the root of the trouble. Definite attempts to reduce the intracranial tension should be made. A dose of croton oil should be given at once. It is probably best to begin by performing lumbar puncture. If the fluid is found to be under pressure some of it should be allowed to escape gradually, drop by drop, until the pressure becomes normal. Too rapid withdrawal may be dangerous. The result of this small operation is often dramatic, convulsions cease, coma clears away, and the hypertensive headache is relieved. Sometimes lumbar puncture has to be repeated several times at intervals before the danger is over. Venesection or withdrawal of six to fifteen ounces of blood with a French's needle will often relieve the symptoms. Another plan is to reduce the intracranial tension by intravenous administration of a hypertonic solution which will attract tissue fluids to the blood. For this purpose 100 c.cm. of a 15 per cent. sodium chloride may be used, or a 50 per cent. solution of glucose may be given. Successful results are also claimed for the use of magnesium sulphate which is known to possess a powerful sedative action. Taken by mouth too little is absorbed to have any effect, but 200 c.cm. of 10 per cent. solution given intravenously or into the gluteal muscles may cause the prompt cessation of the symptoms. If the uræmic phase is prolonged, the treatment appropriate to the underlying nephritis should be continued while it lasts.

RETENTION URÆMIA

True retention uræmia occurs commonly in advanced disease of the kidneys when they are no longer able to deal adequately with metabolic waste products. No definite specific toxin has been discovered to explain this uræmia. There is always some degree of nitrogen retention present; urea, creatinine and uric acid may be affected and their concentrations in the blood rise as the condition advances. The values of these substances in the blood in different subjects is no measure of the severity of the uræmia. Often the figure for urea is high; sometimes even in severe uræmia it is relatively low. Much higher figures may be found without any sign of uræmia in cases of cardiac failure, prostatic retention, or upper intestinal obstruction. It has been thought that the retained nitrogenous bodies might be transformed into some poisonous substance. Examination of the blood in uræmia often shows definite abnormalities. To what extent these may cause symptoms or whether they are merely accidental concomitants is not always clear. The presence of indican and phenol is held to indicate unhealthy intestinal action. The inorganic salts of the blood are often profoundly altered, and the relative proportions of such substances as sodiums potassium, calcium, chlorides, phosphates and sulphate, may be changed. Phosphate retention tends to parallel the rise in nitrogen bodies, while calcium falls as the phosphorus increases. The blood calcium sometimes approaches the low values found in cases of tetany, and this factor may account for the neuro-muscular irritability. Excessive loss of base from the blood leads to a degree of acidosis which is common in nephritis. Dehydration and serious loss of chloride may result from persistent vomiting, diarrhœa, and diuresis. Anæmia is often a complicating feature. Recognition of the presence of these abnormalities will suggest measures for their correction.

The onset of retention uræmia is usually insidious, minor manifestations being present for months before the final stage is reached. The vague early signs are of the same character but are less pronounced than those which occur later. They include weakness, undue fatigability, depression and inability to concentrate. Headache is often the only symptom. The advance of the disease is usually slow, but intercurrent factors may hasten the development of the complete picture of uræmia. It is usual to describe three sub-varieties of retention uræmia, according to the prominence of the symptoms present. The commonest form is the cerebral or nervous; then follows the gastro-intestinal type, and lastly there is the respiratory. Probably these should rather be considered as stages in the full development of complete renal failure.

Treatment.—All subjects of long-standing nephritis are potential candidates for uræmia and should be kept under constant supervision. Once the condition has become fully developed little can be done except to palliate. It is therefore extremely important to recognize the danger as early as possible, when it may still be possible to benefit the patient. Suitable treatment at this stage may delay the advance of the disease and ward off the major symptoms for a time. The principles of therapy for chronic nephritis should be rigorously followed, and everything which may aggravate the disease must be avoided. The patient should live a quiet, well-regulated life, limiting his activities to his capacity to perform them. Fatigue must be avoided and adequate rest enforced. Worry and excitement are harmful. Exposure to cold and wet are dangerous for the already damaged organs are very liable to acute inflammation. The patient should be warmly clad in garments which minimize the chance of chilling. Infections may play a considerable part in aggravating the disease, so it is necessary to look carefully for any focus of sepsis and deal with it. Regular action of the bowels is desirable, and the skin should be kept active.

Dietary control both as to quantity and kind of food taken is important in this stage. A too liberal intake of food may precipitate an attack of uræmia. Anorexia and vomiting tend to limit this danger. Diets recommended for chronic nephritis give chief consideration to the quantity and the character of the protein content. Proteins throw the greatest strain on the kidneys and should therefore be restricted, while extra carbohydrate is taken to keep up the caloric value of the diet. According to the severity of the disease protein may be limited to 80–50 gm. a day. Lower values, except temporarily, are unsatisfactory, for they fail to maintain the nitrogen balance. The idea that red meat is more harmful than white meat receives less support than formerly; indeed, it is common to demand that if the protein is restricted only "first-class" protein should be given. Nephritics always show a tendency to a low alkali reserve and seem to have some difficulty with acids. The " basic ash " type of diet has been found of considerable benefit in cases of long-standing nephritis. It is important to see that the patient does not content himself with too low a dietary intake, for this will increase his weakness and lower his resistance. When polyuria and nycturia are well established it is necessary to ensure that the patient takes sufficient fluids to compensate, and while severe salt restriction is not necessary it is as well to avoid excess. It has frequently been observed that symptoms vary in severity with changes in the urinary output, becoming more marked with oliguria and improving as the urine increases. Every care must be taken to maintain a satisfactory daily secretion. Allowance must be made for fluid loss through fever, excessive sweating or violent purgatives. Attention should be paid to the condition of the heart, and steps should be taken to support the circulation, since failure will decrease urinary excretion and will favour the development of toxic symptoms. If the blood pressure is high, epistaxis or other blood loss may serve as a useful safety-valve.

LATER STAGES

When retention uræmia becomes fully developed all the symptoms become more marked and new ones appear. Weakness and exhaustion become greater, emaciation increases, and there may be a good deal of anæmia. Headache is usually a prominent symptom. It is often occipital in position, of a dull character, yet extremely severe, and very persistent. Mental dulness may express itself in many ways and later there are often signs of increased irritability. Muscular twitchings are of grave import and severe cramps may be complained of. The condition of the skin is often troublesome. It is dry and sometimes shows a covering of " urea frost." Numbness, tingling or burning sensations may be present; pruritus is sometimes severe and an actual dermatitis may develop. The blood pressure is high and remains so until cardiac failure becomes manifest. Gastro-intestinal symptoms may be relatively mild or very alarming. Nausea and anorexia contribute to the wasting and the general weakness. An active distaste for food, especially for meat, often develops. Efforts should therefore be made to modify the diet so as to encourage the patient to take sufficient food. Vomiting may become severe and troublesome, there may be continual retching or persistent hiccough. These are serious symptoms. The vomiting is usually accompanied by nausea and may occur at any time. It may be toxic in origin or may depend upon gastric irritation. Occasionally it is definitely cerebral in type. When vomiting has become persistent the patient is rapidly reduced to a low state. Loss of fluid leads to dehydration, and the loss of chloride may cause severe symptoms. Active measures should be taken to counter these complications. Flatulence and vague abdominal pains may occur and bowel action tends to become irregular if not carefully watched. At first there is a tendency to constipation; later there may be attacks of diarrhœa. The latter are to be regarded as an attempt to get rid of waste products vicariously, and if the patient is not too exhausted by it the looseness should be allowed to continue. The diarrhœa may be merely toxic in origin, it may depend on abnormal putrefaction of the bowel contents, or it may be due to an active colitis or the presence of uræmic ulcerations. Severe diarrhœa must be checked for it will deplete the body of fluid, concentrate the toxins and lead to oliguria. The usual polyuria, together with the effects of vomiting and diarrhœa, will cause the patient to complain bitterly of thirst. In addition, the mouth is often the seat of inflammatory trouble. The tongue is dry and coated with a thick brown fur, sordes may accumulate on the teeth and lips, and the breath has an objectionable urinous odour. Stomatitis or actual ulceration may add to the patient's discomfort. Careful attention should therefore be paid to oral hygiene to prevent the development of sepsis or its spread to the lungs and alimentary canal.

The respiratory system may be affected in several different ways. Resistance to infections is low in Bright's disease; bronchitis is common and a low-grade pneumonia may develop. In cases of subacute nephritis or during an acute exacerbation pulmonary œdema or hydrothorax may appear and embarrass the breathing. The removal of even a small amount of fluid from the chest in these cases often gives the patient considerable relief. Other types of dyspnœa may also be found in uræmia. A paroxysmal dyspnœa known as " renal asthma " may occur, especially at night. The attack resembles spasmodic bronchial asthma, but is characterized by a hissing sound at the end of expiration. In the most severe cases of uræmia " air hunger " due to acidosis is apt to appear, and respiration becomes deep and heavy. Towards the end of life Cheyne-Stokes breathing is not uncommon—it is usually attributed to cardiac failure.

THE FULLY-ESTABLISHED CASE

From the nature of the condition little permanent benefit is to be expected from treatment in a fully-established case of retention uræmia. Much may be done, however, to relieve individual symptoms. As far as possible the general measures designed to reduce the work of the damaged kidneys and favour elimination should be continued when uræmia supervenes. Competent nursing is necessary in all cases, and when alarming symptoms arise active measures should be promptly undertaken if help is to be given.

The persistent headache is one of the commonest and most troublesome symptoms. Drugs are of little use, but reduction of physical effort and insistence on considerable periods of rest during the day may mitigate the distress. Lumbar puncture may offer temporary relief from the headache. The effect of venesection may be tried for the headache if the blood pressure is very high. Some advise a single large bleeding of 15–30 oz., but repeated withdrawal of 6–10 oz. is probably more efficacious. The removal of such small quantities of blood will lead to only a negligible dilution of the toxins. Other symptoms such as the itching may also be relieved by lumbar puncture or venesection.

Sleeplessness, restlessness and general irritability will require attention. A simple remedy such as a warm bath before retiring may relieve these in mild cases, but nerve depressants are usually called for. Bromide is the stand-by, and it may be given alone or combined with chloral. Paraldehyde by mouth or, if necessary, by rectum may be employed. Relatively large doses of these depressants are sometimes required and they may be given in safety. The barbiturates are considered too dangerous in such cases. Morphine may be resorted to if other drugs fail. Most clinicians believe that the risk in employing morphine in chronic nephritis has been greatly exaggerated and that it may be used in ordinary doses without danger. It may aggravate itching and should therefore be avoided when it is already present. Morphine can be given in ¼-grain doses and may be repeated in eight hours if desired. It is useful in controlling general nervousness and is also helpful against muscle cramp, hiccough, and paroxysmal dyspnœa. For muscular twitching and spasm calcium salts may be given, but to be effective large doses are required. Calcium lactate, 30 grains t.i.d. is useful for this purpose. More rapid action can be obtained by giving a suitable preparation intravenously; for example, 10 c.cm. of 10 per cent. calcium gluconate. Parathormone 10–20 units hypodermically will also raise a low blood calcium, but the action is slow.

The condition of the skin is often troublesome. Dryness is difficult to influence and sweating is not easily induced, but a marked increase of well-being is often experienced if a free action of the skin can be obtained. For itching or pruritus external applications are of little benefit. Bran or alkaline baths may be tried, or the surface may be bathed with 2 per cent. phenol solution. A simple calamine lotion is sometimes helpful. Ergotamine tartrate (femergin 1 mgm. tablets t.i.d.) has also been recommended for relief of the itching.

Anæmia when present should receive attention. Gastro-intestinal symptoms may be very dangerous to the patient and every care should be taken to try to prevent their development. Constipation is best avoided by a daily saline. The aim should be to obtain one or two loose motions a day, but drastic purgation is harmful and must not be allowed to occur. Epsom or Glauber's salts are best for the purpose. One writer advises against the too free use of magnesium sulphate as the magnesium ions may be retained and induce coma. This view is not generally held and the danger is probably negligible.

When diarrhœa develops and becomes severe enough to weaken the patient, steps should be taken to control it. The usual remedies may be tried by mouth and colonic lavage with a weak sod. bicarb. solution may be useful.

Persistent hiccough is very exhausting and is a difficult symptom to control. Nerve depressants should be tried, the stomach may be washed out and the application of a mustard plaster or a turpentine stupe over the epigastrium may sometimes help.

The occurrence of vomiting is an alarming sign, and if allowed to continue will rapidly carry the patient downhill. A little sickness may be corrected by restricting the diet for a day to simple fluids such as fruit juices with added glucose, citrated milk, or milk and soda water. When the vomiting is repeated, small doses of such drugs as hydrocyanic acid, or tinct. iodi. are seldom of much use. More is to be expected from lavage of the stomach with normal saline or a weak bicarbonate solution (2 per cent.). In such cases there will be considerable loss of fluid and chlorides to the body, and it is therefore desirable to leave in the stomach one or two pints of normal saline or glucose saline after the lavage. The dehydration and hypochloræmia may necessitate the administration of similar solutions by rectum. The most rapid method of relieving dehydration is to give a pint of 5 per cent. glucose in saline into a vein. For marked hypochloræmia it is perhaps better to administer hypertonic saline (10 per cent.) intravenously. When flatulence is troublesome or there is reason to suspect intestinal intoxication kaolin or powdered charcoal should be given by mouth. The occurrence of respiratory symptoms usually indicate that the end is approaching. For pulmonary œdema full doses of atropine should be given, and venesection sometimes offers relief. Nocturnal dyspnœa may be helped by full doses of bromide or the administration of morphine with atropine. Acidosis with air hunger calls for the use of alkalis, but the effects are not likely to be lasting. Intravenous injection of 4 per cent. sod. bicarb. will rapidly relieve the condition or, if the stomach will tolerate it, sod. bicarb. or sod.citrat., one drachm in water, may be given at intervals of two hours. As potential acidosis is almost always present in chronic uræmia, routine administration of alkalis may help to ward off dangerous symptoms. Heart failure should be watched for in all cases and the patient should be brought under the influence of digitalis on the first sign of it. For emergencies, intravenous strophanthin (1/100 grain) is the most satisfactory drug.

THE INFECTIONS OF THE URINARY TRACT

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THE infective processes of the urinary tract are of such frequent occurrence that they form a definite part of the work of every practitioner and the importance of their early diagnosis and efficient treatment cannot be denied. When it is remembered that the kidneys, unlike some other organs, are essential to life and to health the prevention of avoidable damage becomes a matter of paramount necessity. The introduction of the intense acid treatment has rendered available a remedy, so potent and so reliable, that the prognosis of these conditions can be regarded with equanimity. This revolution in the outlook on the other hand has greatly increased the practitioner's responsibilities towards his patients, because the failure to recognize the presence of the infection and the lack of understanding of those accessory factors, which prolong it, delay treatment long enough to allow the infliction of permanent damage to the kidneys.

The urinary tract extends from the renal capsule to the external urethral meatus. Urethritis does not come within the scope of this article and cystitis will be described in another contribution in this issue. It is proposed to deal with the infective diseases of the kidney and the renal pelvis.

ETIOLOGY

Renal infections are frequent in both sexes, a fact which should cause little surprise when it is recalled that the kidney is an organ of excretion, and organisms circulating in the blood stream *must* pass through the renal tubules. The condition is seen in all ages from infancy upwards and in the first and second decades is equally distributed between the sexes, but after the twentieth year if affects females more than males. The greater liability of the female to chronic constipation and the contiguity of her external genital organs and the anal region suffice to explain this incidence. The right kidney is more frequently affected than the left, but in some patients the infection is bilateral.

The infecting organisms are chiefly ærobic, being in order of their frequency members of the coli group, *Staphylococcus aureus* and *albus*, *Bacillus proteus*, streptococci of various strains and occasionally other intestinal bacteria and very rarely the gonococcus and pneumococcus.

The paths of invasion are (1) hæmatogenous. The circulating blood contains organisms more frequently than is generally appreciated. These must pass through the kidneys, in which they may succeed in passing through to the urine without apparent ill effect, they may enter and destroy the renal cells or they may be themselves killed off. The portals of entry are often impossible of definition especially in the case of the coli group. Constipation, appendicitis, gastro-enteritis, cholecystitis and in women tears of the hymen, perineum and cervix may all provide the opportunity for the absorption of coli organisms. The staphylococcal infections are usually derived from comparatively trivial skin lesions, such as boils and carbuncles. (2) Ascending infection from the lower urinary tract, i.e. bladder, prostate, seminal vesicles and epididymis may give rise to a lesion of one or both kidneys. The renal involvement may be due to a spread up the peri-ureteric lymphatics or may be by the blood stream. It is unlikely that this type of invasion can occur unless there is some obstruction to one or both ureters. (3) Lymphatic. A definite lymphatic connection has been shown to exist between the ileo-cæcal region and the right kidney and it appears possible that infection may be carried by this route.

Certain accessory factors play a considerable part in the onset and in the duration of renal infections. The most important is obstruction to one or both ureters. The danger of an ascending pyelonephritis in cases of enlargement of the prostate or of stricture of the urethra is well recognized, but a unilateral hydronephrosis may be unsuspected at the onset of an acute pyelitis and be the cause of an unexpected failure of treatment; any of the many cases of such hydronephrosis may be found in operation. The slight degree of compression of the ureters by the pregnant uterus explains the liability of pregnant women to pyelitis. Injury to the kidney by subcutaneous or penetrating wounds or by the presence of calculi may also act as a predisposing factor.

THE PATHOLOGICAL CHANGES

Acute infections of the kidney are invariably referred to as "acute pyelitis," a term firmly established by long usage. It is, however, somewhat misleading and does not present a complete picture of the pathological findings, a clear appreciation of which is essential to an understanding of the clinical and therapeutic problems. The pelvis is acutely inflamed, the mucous membrane being œdematous, swollen and of a blazing red colour. This swelling in the region of the uretero-pelvic junction is sufficient to occlude temporarily the ureter and this leads to a damming back of the infected urine and the distension of the kidney against its firm capsule. The result is that there is an absorption of toxins from the pelvis in large doses into the general circulation. This is the explanation of the sudden onset and the severity of the initial symptoms. The inflammatory reaction is not confined to the pelvis and, although the renal parenchyma appears normal to the naked eye, there is an intense round-celled infiltration and later minute areas of focal necrosis.

THE CLINICAL PICTURE

ACUTE PYELITIS (acute primary hæmatogenous renal infection) is one of the commonest of renal diseases. It may occur at any age and in either sex, but after puberty is commoner in women and attacks the right side more frequently than the left. The majority of cases are due to the *Bacillus coli communis*, but staphylococcal infections are well known.

Symptoms.—There is likely to be an initial stage of weariness and lassitude, of which the patient thinks nothing. It will last not more than thirty-six hours. The classical symptoms are:—(1) Pain, (2) vomiting, (3) rigors, (4) pyuria, (5) high fever, (6) frequent and painful micturition, (7) headache.

Pain is renal in type; it is felt deep in the loin and is described as being in the back at the costo-lumbar angle and in the front of the abdomen below the costal margin. It may also be referred to the usual areas, i.e. downwards and forwards into the groin and scrotum or labium majus and over Poupart's ligament into Scarpa's triangle. Vomiting usually occurs as an initial attack with the onset of the pain and is rarely continued beyond the first two hours. Rigors are so constant a feature that they are to be regarded as almost pathognomonic. Pus is always present in the urine, but it must be clearly understood that during the first twenty-four or forty-eight hours the quantity may be so small that it is difficult to demonstrate by chemical tests and a microscopic examination will be needed in most cases.

High fever is characteristic, the temperature rising abruptly to 105° F. in severe cases. Frequent and painful micturition does not appear till the second or third day and is never a really prominent symptom.

Headache is present in every patient in a more or less mild degree, but occasionally it becomes so severe as to dominate the picture. This can be most misleading.

Case 1.—A single woman aged 29 had been taken ill ten days previously with malaise, fever and a pain in the back. The condition was regarded as influenza. For twenty-four hours before I was asked to see her she had a really severe headache limited to the right facial, frontal, parietal and temporal regions and had been persistently sick. It was only after eliminating sinus and antrum disease and any intracranial lesion that I turned to a more critical examination of the history and found tenderness in the right loin and a marked pyuria. The condition cleared up rapidly under treatment.

The clinical picture varies considerably according to the severity of the infection; there are three types.

Type I.—Acute fulminating pyelitis has such a sudden and dramatic onset that it may be mistaken for a perforation of a gastric or duodenal ulcer. The patient is suddenly seized with violent pain in the loin, in the costo-lumbar angle in the back and in the front of the abdomen below the costal margin. An attack of vomiting occurs without any relief from the pain, which continues unabated in its severity for many hours. The temperature rises abruptly to 105° F. and within the first few hours there will be one or more rigors and on the second day frequent and painful micturition makes its appearance. In some patients the pain is so severe that they collapse and are unable to move, having to be carried to bed. On examination the patient is found to be restlessly tossing in bed unable to find relief in any position, the face is flushed and sweating, the temperature is very high and the pulse is rapid and full. Bimanual palpation of the renal area reveals tenderness and rigidity of the muscles of the loin.

Case 2.—A young woman of 25 years of age, who had lived in Northern Africa since her marriage eighteen months previously, was in London on her first leave and was entertaining a large party of her husband's friends at a well-known restaurant. She had been feeling a little tired for two days, but naturally attributed this to the rather busy life she had been leading in London. Half way through dinner she suddenly felt extremely ill, was violently sick and collapsed across the table. She had to be carried from the room and was taken direct to a nursing home, where she was found to have a temperature of 105° F. and complained of agonizing pain in the right side. The right renal region was tender and rigid and the urine contained pus. Her tropical life and the severity of the attack led to some confusion in diagnosis but in reality the story was typical.

Case 3.—A young woman of 28 years of age, whose home was in the country near London, spent a day shopping in town and had arranged to meet her husband, a doctor, at the London terminus late that afternoon. On meeting she said that she was tired but otherwise well and they passed through the barrier on to the platform to await their train. Five minutes later she suddenly grasped her husband's arm, said she felt a violent pain in the right side, staggered to the edge of the platform and was sick into the permanent way. She was carried into a carriage in a collapsed condition and eventually reached home in agonizing pain. Her temperature was 104·6° F. and that night she had one severe rigor. The following morning the diagnosis was made from the telephoned story, in spite of urgent appeals to come and operate for acute appendicitis. This patient will be referred to again during the description of treatment.

Type II.—Acute pyelitis is of less intensity and more gradual onset and is liable to be mistaken for acute appendicitis. The introductory stage of weariness and lassitude will be noticed for two or three days and then the patient will complain of pain in the loin which within a few hours increases to a considerable severity. An initial attack of vomiting is usually but not always present, but one or more rigors are invariably seen and the temperature rises to 102°–103° F. There is definite tenderness in the loin, but only in the period of maximum pain will there be rigidity.

Type III.—Subacute pyelitis shows only mild pain, no vomiting, no rigidity and a temperature of 101° F. Rigors are slight and transient, and pus is found in the urine in considerable quantity from the beginning.

DIFFERENTIAL DIAGNOSIS.—Right-sided pyelitis.—In the diagnosis emphasis must be placed on the definitely renal position of the pain, the high fever, the rigors and the pyuria. Mistakes occur because of failure to keep the kidney in the forefront of the mind as the likely site of disease and consequently a routine examination of the urine is omitted on so many occasions.

The perforation of the peptic ulcer.—The early stages are characterized by low temperature, slow pulse and by more widespread tenderness and rigidity. Later the well-known stage of pseudo-recovery occurs, which is never seen in pyelitis. A history of peptic ulceration can usually be obtained.

Acute appendicitis is the commonest mistaken diagnosis in the acute types of pyelitis. The pain begins by being central around the umbilicus and later travels to the right side. The temperature rarely reaches the heights of pyelitis and there is never a rigor. Tenderness and rigidity are at a lower level and the area of hyperæsthesia is entirely different in the two conditions. *Acute cholecystitis* and *gall-stone colic* may give difficulty, but the previous history, the type of the pain and the physical signs are different. The temperature is never so high and rigors do not occur, unless acute cholangitis is present. Other renal lesions such as calculus, hydronephrosis, Dietl's crises may exhibit equally severe pain but these conditions are not inflammatory.

Left-sided pyelitis gives rise to less confusion, acute diverticulitis and intestinal obstruction being possible diagnoses.

TREATMENT.—The treatment of urinary infections by ketosis is one of the most important advances in the post-war era. Before its introduction, pyelitis was regarded almost as an incurable disease and patients were condemned to harbour a *Bacillus coli* infection for the rest of their lives. This belief is not yet eradicated from the minds of many patients and some practitioners.

The acute stage.—The patient is to be confined to bed and strictly nursed. The object of treatment is to produce a profuse diuresis and it is aimed to reach the secretion rate of 200 oz. of urine in twenty-four hours. This can be achieved only by loyal nursing and with the co-operation of the patient, who will protest at first that she is incapable of drinking twelve pints of fluid in the twenty-four hours. The nature of the fluid matters little, barley water, orange and lemon drinks and plain water being used according to taste. During the first three days the fluid intake may be augmented by giving one pint of saline and glucose per rectum four times during the twenty-four hours. No food is given during this period, after which tea, milk, chicken jelly, calves foot jelly, bread and butter and vegetable soups may be given. An aperient is administered on the first day and enemas on alternate days for the first week. A careful chart of fluid intake and urine output must be kept. I have not yet succeeded in reaching the 200 oz. excretion rate, but the patient referred to as case 3 maintained a flow of between 192 and 196 oz. for seven days with the result that she was afebrile on the sixth day in spite of the severity of the attack. Herein lies the whole secret of treatment, and in successful cases the temperature should be normal within ten days but the urine will still be heavily infected. The patient should be kept in bed for seven days after the temperature is normal and the second stage of treatment begun.

The post-febrile stage.—As soon as the temperature has settled or has fallen below 100° F., the ketonuric treatment is adopted. The object now is to eradicate finally the organisms from the urinary tract and the work has not been completed until that has been achieved.

The ketonuric treatment.—A chance observation that the urine of epileptics, being treated by ketosis, was of a very high acidity led Clarke and Helmholtz in 1931 to introduce the ketogenic diet as the method of treating urinary infections. Fuller working in the research laboratories of Queen Charlotte's Hospital in 1933 demonstrated that the bactericidal agent in ketone urine was lævo-rotatory β-oxy-butyric acid produced as an end product of the metabolism of the fats. Helmholtz has since shown that this substance must be present in a concentration of at least 0·5 per cent., and that the pH of the urine must not exceed 5·4. The methods of producing this ketosis are the ketogenic diet and the administration of mandelic acid with ammonium chloride by mouth.

The ketogenic diet is carefully arranged by scientific calculation to give a diet of the value of 2,300 calories a day and is balanced as follows :—

Carbohydrates - -	15 grammes	per day.
Proteins - - -	52 grammes	
Fats - - -	226 grammes	

Its successful application demands the help of a dietitian in providing suitable alternatives to overcome the depressing repetition of unpalatable food, without at the same time upsetting the balance and the total quantities of the various constituents. The pH must be estimated daily and bacteriological examinations of catheter specimens must be done on the seventh, ninth, eleventh and thirteenth days. The urine should be sterile on or before the seventh day and if it remains so all treatment may be discontinued on the fourteenth day.

*Specimen diets**.—The daily ration may be arranged as follows :—

Eggs, 2 or 3.
Gluten rolls, 4 or 5.
Butter, 4 oz.
Cream (must be 60 per cent. fat) 10 oz.
Meat or fish, 3 oz.
Salad or green vegetables, 5 oz.
Fruit, gooseberry or rhubarb, 4 oz.
St. Ivel cheese, ¾ oz.

Use especially omelettes, scrambled eggs, fruit fool with 4 oz.

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* I am indebted to my colleague Dr. T. C. Hunt for his kind advice concerning these diets.

cream, tomato or celery soup with 4 oz. cream, tea and coffee with 2 oz. cream.

Do NOT USE flour, bread, milk puddings, toast, sugar, milk, biscuits, cakes or potatoes.

Example A.

Breakfast -	1 oz. bacon, 1 egg, 1 gluten roll, ½ oz. butter, tea with 1 oz. cream.
Lunch -	2 oz. cutlet or chicken or steamed fish. 2 oz. salad celery, lettuce, cucumber or cress; or 3 oz. cabbage or spinach. Coffee mould with 1 oz. extra cream. Lemonade.
Tea - -	1½ scrambled eggs with 1 oz. butter or omelette. 1 gluten roll and ½ oz. butter.
Supper -	1½ oz. sardines or tinned salmon. 2 rolls and 1 oz. butter. Coffee. Gooseberry or rhubarb fool with 4 oz. cream. Fruit 4 oz. with cream.
Night -	1 oz. olive oil.

Example B.

Breakfast -	1 oz. ham, half portion salad, ½ oz. butter, tea with 1 oz. cream.
Lunch -	Soup (4 oz. cream) 1 oz. beef, ½ oz. fat, 3 oz. cabbage, 1 roll, ½ oz. butter, chocolate mould with 1 oz. extra cream. Lemonade.
Tea - -	Boiled egg, one roll, ½ oz. butter, tea (1 oz. cream).
Supper -	¾ oz. St. Ivel cheese and salad, 2 rolls, 1 oz. butter, tea, 1 oz. cream, gooseberry fool (4 oz. fruit, 4 oz. cream). Coffee (1 oz. cream).

Example C.

Breakfast -	1½ scrambled eggs (1 oz. butter), roll, ½ oz. butter.
Lunch -	Cream tomato soup, 1 oz. roast beef, ½ oz. fat, 1 roll. Coffee cream mould with 1 oz. cream, lemonade.
Tea - -	¾ oz. St. Ivel cheese, 2 rolls, 1 oz. butter.
Supper -	1½ oz. cold chicken, salad, roll, ½ oz. butter. Gooseberry fool. Coffee (1 oz. cream).

The diet must be adhered to absolutely or abandoned altogether; there is no such thing as a partial ketogenic diet. As Clarke says, a 90 per cent. diet does not give 90 per cent. results, in fact it gives unrelieved failure. The fluid intake need not be restricted beyond the patient's normal amount, but it should not exceed four pints a day. Constipation must be corrected but the only aperients allowed are liquid paraffin, phenolphthalein and the biliary and intestinal extracts, e.g. eulaxase or taxol.

Mandelic acid treatment has greatly simplified the procedure and provided the instructions are faithfully observed it can be carried out in the patient's own home. Mandelic acid in doses of 3 grammes combined with 1·3 grammes of sodium bicarbonate is given four times a day, and 1 gramme of ammonium chloride is taken eight times a day. The total fluid intake *must* be limited to two pints during the twenty-four hours, but no other restriction in diet is needed. A most convenient outfit is supplied by The British Drug Houses with the mandelic acid and the bicarbonate combined in tablet form and the ammonium chloride in capsules. The restriction in fluids and the nausea induced by the ammonium chloride are real disadvantages.

Recently an attempt to combine all three constituents in liquid form has been marketed under the name of mandelix. In my hands it has not always reduced the pH and additional ammonium chloride is needed. The supposed advantages over the mandelic acid are not therefore obtained, and I have reverted to the original mandelic acid. The ease of administration of mandelic acid make it preferable to the ketogenic diet, and it has become the routine method. The restriction of fluids will prove to be a serious, if not insuperable, difficulty in hot climates and in heat-wave periods in this country. The nausea must not be allowed to vitiate the treatment. If patients threaten to give it up, they should be starved completely for two days and allowed to burn their own fats, after which they often regain their tolerance and continue with success.

The causes of failure.—(1) The intolerance to the fat of the diet or the ammonium chloride of the mandelic treatment. These must be overcome if possible. (2) The failure to reduce the pH below 5·4 is almost always due to errors in diet or to exceeding the fluid ration. Every effort must be made to trace and correct the fault. (3) The presence of an unsuspected accessory factor such as focal sepsis in other parts of the urinary tract or the obstruction to either one or both kidneys. Uncomplicated cases of both coli and staphylococcal infections should clear up if the treatment is faithfully observed within seven to ten days, and if the urine is not sterile on the fourteenth day, the treatment should be abandoned. It has been shown that the ketosis fails to maintain its bactericidal power after twenty-one days. These patients must be completely overhauled by X-rays, excretion pyelograms, cystoscopy, urethroscopy, and examination of the prostate, vesicles and epididymis. The importance of these accessory factors are well illustrated by the following cases :—

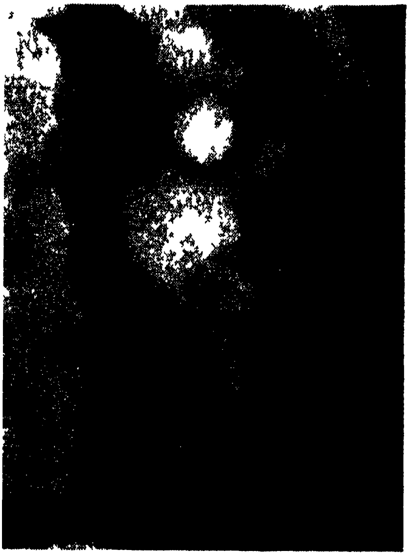

FIG 1—A retrograde pyelogram of the patient referred to as case 4, showing the large hydronephrosis of the left kidney

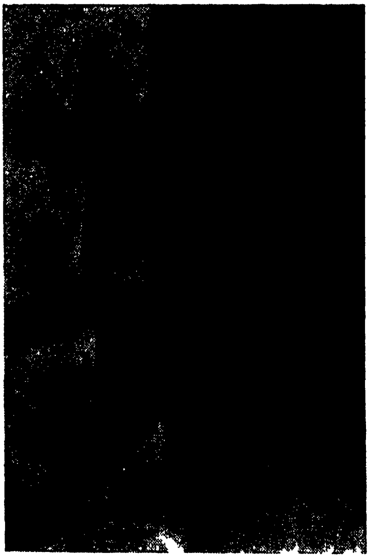

FIG 2—X ray photograph showing small calculus impacted in the right uretero pelvic junction in the patient referred to as case 5

Case 4.—A recently married woman aged 22 had an acute attack of pyelitis, diagnosed as cystitis In spite of treatment of every description, she continued to have mild symptoms and the *B coli*.

persisted in the urine, and she had become imbued with the idea that such an infection was incurable. After eighteen months she became pregnant and at the eleventh week she was brought to see me. An excretion pyelogram showed a hydronephrosis of some size of the left kidney and ureteric catheterization proved that the infection was limited to the left side. Owing to foreign domicile with no skilled attention it was decided to empty the uterus. Six weeks after the left kidney was exposed and an aberrant artery found running into the apex of the cortex of the lower pole. This was divided and the pelvis drained for three days, after which the sinus closed in three days. A course of mandelic acid sterilized the urine within four days. (Fig. 1).

Case 5.—A nurse, aged 19, giving a history of acute pyelitis was found to have pyuria and a temperature of 105·6° F., and there was a definite trace of blood, which led to a discussion of the possibility of stone. After four days treatment the temperature remained around 105° F. and a severe rigor occurred each night. An X-ray revealed a small stone impacted at the uretero-pelvic junction (Fig. 2).

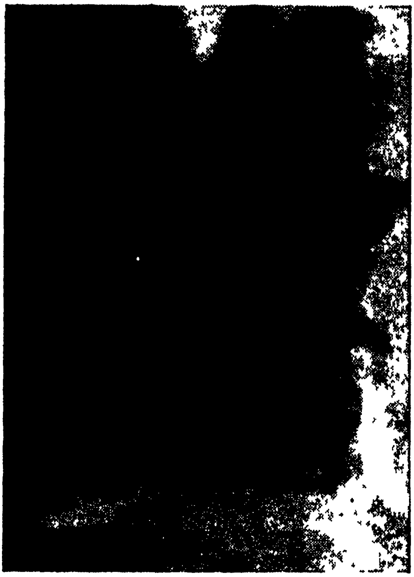

FIG. 3.—An X-ray photograph showing a stone in the pelvis of the left kidney in a patient who had several years before developed an acute pyelitis during pregnancy. On a previous occasion a calculus had been removed from this kidney but the infection had not been overcome. Treatment after the removal of the stone quickly and easily eradicated the urinary infection.

This case raises the question of the desirability of early X-ray in all patients. A large majority of cases are uncomplicated and clear up readily under treatment. Many such patients are treated in their own homes and are too ill to move and an X-ray may present difficulties of access or of finance. A skiagram becomes a necessity only when treatment has failed.

ACUTE SECONDARY ASCENDING RENAL INFECTION

This condition is usually bilateral. It is secondary to disease in or distal to the bladder, e.g. pelvic and puerperal infections in women and enlarged prostate and urethral stricture in elderly men. The infecting organisms are usually staphylococci or streptococci. It is therefore a complication of pre-existing disease and is only too frequently the closing scene of life.

Symptoms.—During the course of other disease either spontaneously or after instrumentation or operation, the patient suddenly has a rigor and the temperature rises steeply to 104°–105° F. There is pain in both loins and nausea and drowsiness. The tongue is dry and furred and the abdomen is distended. One or both kidneys are palpably enlarged and tender. The secretion of urine is diminished or abolished. In the fatal cases delirium and coma rapidly usher in a fatal issue, while in others after some days of extreme anxiety the flow of urine is re-established and the condition subsides, leaving permanently damaged kidneys.

Treatment should be prophylactic and no surgical interference carried out till the renal function has been estimated. Active drainage must be obtained by suprapubic cystostomy done under a local anæsthetic, and as a last desperate resort a bilateral nephrostomy may be done.

The acute pyelitis of pregnancy differs in no way from the condition described above. In spite of the pressure of the uterus on the ureters, treatment is successful in most cases.

The acute pyelitis of children is seen in both sexes and there is often a history of recent gastro-intestinal disturbance. The attack is usually severe and follows the typical course as described above. It is emphasized here as its existence in children is not sufficiently realized and the diagnosis may be delayed on that account. Children respond well to the ketogenic diet, which will be preferable to mandelic acid for them if the facilities exist for its provision. The pH may fall even to 4·8 in children under ten years of

CHRONIC PYELITIS, once a common condition, is rapidly becoming an index of missed diagnosis or imperfect treatment, and in time its very existence will be a reproach. The introduction of the ketogenic diet was accompanied by the return—in large numbers—of old patients with chronic pyelitis to see if at long last a cure had been found. Chronic pyelitis follows an unresolved acute attack and is characterized by the presence of pus and bacteria in the urine and slight symptoms of general loss of condition. These patients are liable to constant exacerbations of the infection and are suffering from a definite, if slight, diminution of renal function and each attack takes a little more of their reserves and of their vitality away. The infection in these people was not limited to their renal pelvis, but was true pyelo-nephritis, and all forms of treatment, such as alkaline and acid diuretics, vaccines and pelvic lavage, were all equally futile.

Treatment.—At the present time a patient with chronic pyelo-nephritis must be subjected to a complete urological overhaul. The excretion from each kidney must be investigated for the presence of organisms, for any abnormal constituent and for the efficiency of that kidney. If the findings are compatible with the diagnosis of a simple urinary infection on one or both sides, treatment by ketosis is started forthwith. If this fails to sterilize the urine within three weeks, it must be discontinued. In long-standing cases, in which the infection is confined to one kidney and the other kidney is not infected and is efficient, and if a pyelogram of the effected side shows appearances suggestive of renal damage, then it will be wise to consider removal of the infected kidney.

THE DIAGNOSIS AND TREATMENT OF URINARY LITHIASIS

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RENAL CALCULUS

IN over a third of the stone cases admitted into St. Peter's Hospital, the calculus lies in the upper urinary tract. This probably under-estimates the frequency of renal and ureteric lithiasis, as many patients with indefinite symptoms are admitted to general hospitals. In the case of stone in the bladder, the urinary symptoms are usually so definite that the patient attends a special hospital. Renal lithiasis is a disease of middle life, over 50 per cent. of the patients being between 30 and 50 at the time of operation. It is somewhat more common in the male than in the female, and both sides are affected with approximately equal frequence. Bilateral calculi are found on an average in about 15 per cent. of cases. The earliest stones that can be detected clinically are those that throw a shadow about the size of a pin's head on an X-ray film. They generally lie in the lower calyx, and it must be concluded that this is where most stones form. From there they tend to migrate into the renal pelvis, and if they are small enough they pass down the ureter. If, however, one is too large to be passed naturally, it tends to stick at the junction of the renal pelvis and ureter. It then begins to grow backwards towards the kidney, and soon takes on a triangular shape, corresponding to that of the renal pelvis. In fact, it becomes moulded to the shape of the cavity in which it lies. If the stone is phosphatic, or becomes covered with phosphates owing to secondary infection, and therefore grows rapidly, a complete cast of the whole pelvo-calyx system may be formed. These calculi are often called "branched," "stag-horn" or "coralliform." Slow-growing stones, such as those formed entirely of calcium oxalate do not reach this size. They rarely do more than fill the renal pelvis.

The effects on the kidney mainly depend on the presence or absence of infection. An aseptic calculus tends to give rise to a hydronephrosis, and ultimately destroys the kidney by fluid pressure. On the other hand, an infected stone acts more rapidly. A pyelonephritis sets in, which if obstruction is also present, soon becomes a pyonephrosis. The most common type of pyonephrosis is that in which the kidney contains large masses of stone lying in comparatively small pus-filled cavities. The organ is not greatly increased in size, but it rapidly becomes functionless. Two other forms of calculous pyonephrosis are also described, but they are much less common. The first is the giant form, in which the kidney is transformed into an immense pus-filled sac, the outlet from which is obstructed by a small stone impacted at the junction of the pelvis and ureter. The second is the atrophic form. In this the kidney is much smaller than normal, and may be transformed into a small simple sac with rather thick fibrous walls, in which remains of kidney tissue may be found. It is often imbedded in a large mass of dense sclerotic fatty tissue.

Symptoms.—It is best to discuss the symptoms of renal lithiasis under three headings—(1) those caused by a stone passing down the ureter (renal colic), (2) those caused by an uninfected stone retained in the kidney, and (3) those of infected lithiasis.

(1) True renal colic is caused by a stone or some other body such as a blood clot, a mass of caseous material, or a hydatid daughter-cyst, passing down the ureter. Pain of a similar type is produced when the upper end of the ureter is blocked by a pelvic

calculus, in cases of hydronephrosis, or if the renal pelvis is over-distended during pyelography or lavage. As a rule the onset is sudden, but occasionally there are slight prodromal symptoms, such as a sense of weight or discomfort in the loin, or tenderness along the course of the ureter or of the testicle. It usually occurs when the patient is at work, but may come on when he is resting, or even in bed. The pain is intense, and is paroxysmal like all true colics. It starts in the back, in the angle between the last rib and the erector spinæ muscle, spreads round to the front of the abdomen, and downwards above the iliac crest into the iliac fossa, and from there into the groin, the testicle and the front of the thigh. It is accompanied by some rigidity of the flank muscles. Occasionally the whole of the corresponding side of the abdomen is painful, and the distribution is not well marked as just described. It is exceedingly rare for the pain to spread upwards towards the corresponding shoulder, or to cross the middle line to the opposite side. As a rule, the more intense the pain, the more widely does it radiate from the point where it was first felt. It is also rare for the pain of a hydronephrosis to radiate far from the loin.

Renal colic is usually accompanied by numerous reflex symptoms. The first are due to a fall of blood pressure. The facies is drawn and pale. The skin is covered with cold sweat, and the extremities are cold. The pulse is small and thready, it is more rapid than normal, but rarely exceeds 100. Gastro-intestinal symptoms are present in over 75 per cent. of cases. The most common are nausea and vomiting, constipation and flatulent distention of the bowels. Occasionally there is a watery diarrhœa accompanied by rectal tenesmus. Increased frequency of micturition, and vesical tenesmus are only marked when the stone is close to the bladder. They do not occur when it lies in the upper portion of the ureter. Erections and other signs of irritation of the genital tract are occasionally noticed if the stone lies near a seminal vesicle. The urine is scanty, and always contains blood if the colic is due to a stone. The bleeding is rarely profuse, but is usually sufficient to render the urine smoky, and can be detected by the naked eye.

Renal colic terminates in either of two ways. The patient may feel that something has given way within him, and the pain suddenly ceases. In this case, the stone has passed into the bladder, and colic ending this way is termed "complete." If the stone is not passed, the colic is "incomplete." The pain then gradually dies away, but may recur at any time. A patient may have several attacks in the course of a week or two before he finally passes the calculus.

The *treatment* of a renal colic consists in relieving the spasm of the ureter. It is best to give a full dose of some sedative as soon as the diagnosis is made, but an intraperitoneal lesion, such as an acute appendicitis or a perforation of a hollow viscus must be first excluded. Morphine is comparatively ineffectual in these cases. It is better to give a preparation containing the total opium alkaloids, such as omnopon. A third of a grain should be given subcutaneously, and may be repeated if necessary in four hours. As soon as the pain begins to diminish, the patient should be encouraged to drink as much as possible. It is a mistake to give fluids when the pain is at its worst, as it only aggravates the patient's condition. Hot compresses to the painful area are also helpful. If a ureteric catheter can be inserted above the level of the stone, it relieves the tension in the renal pelvis, and abolishes the pain, but this can rarely be done until an efficient sedative has been administered.

(2) The symptoms of an uninfected stone in the

kidney are pain and hæmaturia. There may also be some frequency of micturition, but it is comparatively slight. The pain may be acute, resembling a renal colic, but it is usually confined to the loin, and rarely lasts as long as true renal colic. The most characteristic pain of this condition is a dull ache in the loin, which is increased by exercise or jolting, and is relieved by rest. For this reason it is usually worse in the evening than in the morning. It is felt in the back, in the angle between the erector spinæ muscle and the last rib, but if severe may spread to the front of the abdomen. It is usually accompanied by tenderness in the loin. Blood is nearly always present in the urine, unless the patient is confined to bed. The amount is variable, and depends on the severity of the pain. If the latter is severe the urine may be definitely smoky, but if it is absent there may be no obvious bleeding. The urine looks perfectly clear, and there is no cloud on boiling it, but a few red blood-cells will be found on microscopic examination. These alterations in the amount of blood in the urine, running a parallel course with the severity of the pain, and the amount of exercise taken, are highly suggestive of stone. It is rare to find a large mass in the loin, as the kidney is seldom much enlarged in these cases, but there is usually distinct tenderness on palpation.

(3) Infected calculus. The symptoms in this condition are often comparatively slight. In many cases there is nothing but a symptomless pyuria, and unless the patient has noticed that his " water is thick," he may not seek advice. The pain is comparatively slight, and is often attributed by the patient to lumbago, or some similar condition. Still it is aggravated by exercise and relieved by rest. The amount of blood in the urine is usually stated to be less than in unaffected cases. It might be more correct to say that it is more difficult to find a few red cells when the

urine contains a large amount of pus. Still in many of these cases blood can be found on microscopic examination, although it may not be detected on routine examination of the urine. A slight degree of fever is not uncommon, even in patients in whom the stone gives rise to few symptoms. If there is retention of infective material there is usually a swinging septic temperature, together with severe pain in the loin. Acute infections of the calculous kidney are associated with very high temperatures (up to 104° F.) and repeated rigors. Patients with this complication may require an immediate nephrectomy to save life, but the condition is fortunately rare. In all cases there is a deterioration of the general health, and the patient steadily goes down hill until the sepsis is relieved by a suitable operation.

Examination.—In cases of renal colic the kidney is enlarged and tender, but it is always difficult to feel it on account of rigidity of the overlying muscles. There may be some tenderness over the course of the lumbar ureter. The testicle may also be tender, but apart from these signs examination is usually negative. When a stone is lodged in an uninfected kidney, the organ is seldom much enlarged. It is, however, tender on pressure, and even if the kidney is not felt there is loin tenderness. When the kidney is infected, it may be any size from a small atrophic organ to a huge pyonephrosis filling the whole flank. Even when the kidney is not much enlarged, a rounded, ill-defined firm mass which does not move freely with respiration, or from side to side, may often be felt. This is simply an overgrowth of the perinephritic fat, which becomes tough and infiltrated with fibrous tissue. It is only in long-standing cases of renal infection that marked changes on physical examination are found.

Radiography.—A presumptive diagnosis can be made from the history, physical findings, and the state of the urine. This must in all cases be confirmed by radiography. A good skiagram of the urinary tract should show the whole of the eleventh and twelfth ribs, the spine from the tenth dorsal vertebra downwards, and the complete outline of the true pelvis. It should also show the shadow of the psoas muscle on either side of the vertebral column, and the outlines of the kidneys, especially in their lower two-thirds. No matter where the stone is supposed to lie, it should embrace the whole of the urinary tract. The shadow of a stone in the renal pelvis lies in the clear space between the inner border of the renal shadow and that of the psoas muscle. It is usually opposite the second lumbar vertebra, but if the kidney is enlarged it may lie at a slightly lower level. The shadow is usually triangular, with the apex pointing inwards towards the spine. A stone in the lower calyx throws a shadow which lies opposite the third lumbar vertebra, about one to one-and-a-half inches from the outer border of the psoas shadow. It lies on or near a line drawn vertically upwards from the highest point of the iliac crest. A stone in the middle calyx lies approximately at the same level as one in the renal pelvis, and its shadow usually lies about two-and-a-half inches from the outer border of the psoas shadow. It is rare to find solitary stones in the upper half of the kidney, the shadows in this region should be considered doubtful unless a definite pelvic calculus is also present.

It is now easy to confirm the findings of a plain skiagram by giving an injection of uroselectan-B. By this means the position and size of the pelvis and calyces are clearly defined, and their relationship to the supposed stone shadow can be demonstrated. It also demonstrates the presence of a calculus in the rare examples in which the stone is " transparent," and does not throw any shadow in a plain skiagram. The rapidity of elimination, and the density of the dye shadow is also a rough indication of the functional value of the kidney. In this connection, it should be remembered that if a kidney is completely obstructed, as, for example, by a stone in the ureter, no uroselectan may be eliminated through it. This does not necessarily mean that the kidney is permanently functionless. It may recover a great portion of its excretory value after the obstruction has been removed.

Treatment.—(1) Uninfected lithiasis. Operation should be advised in all patients in whom the stone is too large to be passed naturally. As most of such stones lie in the renal pelvis, a pyelotomy is generally indicated. This operation is remarkably safe, and is seldom followed by complications. Nephrectomy is indicated in the rare instances in which the kidney is destroyed by back pressure, or when the stone is associated with some other conditions, e.g. a new growth or tubercle. Nephrotomy should be avoided as far as possible. It may be necessary to incise the kidney if the pelvis lies entirely inside the renal sinus, or if the organ cannot be delivered on the loin. The results in uninfected cases are remarkably good, and a recurrence is comparatively rare.

(2) Infected lithiasis. Assuming that the opposite kidney is healthy, a nephrectomy is indicated for all forms of pyonephrosis, and for cases of large branching calculi. When the stones are small, but still too large to pass naturally, much depends on the nature of the infection. If it is due to the *Bacillus coli*, a pyelotomy may be performed, provided the renal function is good. The infection will probably clear up after operation. If, however, pyogenic cocci, the *Bacillus proteus*, or a mixed infection is present, much more radical measures are necessary. It is in these cases that recurrences are so common. It is best to remove

the kidney even if its function is only slightly impaired.

(3) Bilateral stone. In most of these cases the urine is infected. Large branching calculi filling the pelvis and calyces on both sides are best left alone. The patient will probably live longer if nothing is done. In these cases the pain is usually slight, and the patient suffers little inconvenience. Comparatively small stones in both renal pelves should be removed as soon as possible, as there is always a risk of anuria developing. If one kidney is pyonephrotic, and the other contains a comparatively small calculus, it is best to remove the grossly infected functionless organ first, and perform a pyelotomy on the opposite side two or three weeks later. In all these cases the prognosis is poor. Every effort should be made to cure the infection, and the patient should be X-rayed every six months in order to see if a fresh stone is forming. It is for these patients that medical treatment is of most value. The patient should be kept on an " acid ash " diet, i.e. principally fats and proteins, with the minimum amount of carbohydrates. He should also be given an adequate supply of vitamin A. The urine should be kept strongly acid. The patient should be instructed to test its reaction every day, and if it becomes alkaline, some form of acidifier should be given. Under these conditions there is little risk of a recurrence, as phosphates are only deposited in alkaline urine, and at the same time drugs such as hexamine exert their full effect.

URETERIC CALCULUS

Any stone that passes down the ureter may theoretically be called a ureteric calculus. If so, such stones must be considered to be at least as frequent as renal calculi. Impacted calculi that require open operation are much less common, and only account for about one-fifth of the stone operations on the upper urinary tract. A calculus may, however, be arrested for a considerable time in its passage down the ureter, and ultimately be passed naturally. In many cases its passage may be hastened by manipulative measures, such as the passage of ureteric catheters and injection of lubricants, etc.

About 70 per cent. of impacted calculi are to be found in the pelvic portion of the ureter, generally about one or two inches above the bladder. A stone is usually round or oval when it leaves the kidney, but becomes elongated as it lies in the ureter. Stones removed by operation usually resemble an orange pip or a date stone. Very large ureteric calculi are distinctly rare. At the same time it should be remembered that ureteric calculi are usually more destructive to the kidney than stones lodged in the renal pelvis. Removal of a comparatively small stone from the ureter should therefore be advised if there is evidence of marked back pressure.

Symptoms.—The rapid passage of a stone down the ureter is usually accompanied by an acute renal colic (see above). In many cases the stone passes slowly, in which case the colic is repeated, and especially if it is not very intense, the patient may notice that the position of the pain alters. At first it is most intense in the back, then it tends to shift round to the front of the abdomen and is felt about one-and-a-half inches laterally from the umbilicus. The next common painful spot is where the ureter crosses the brim of the pelvis. This is almost identical with McBurney's point. When the stone is about to drop into the bladder, the pain is felt near the external abdominal ring. In this case there is usually frequency of micturition and pain in the penis during the act. There is tenderness on palpation over the painful areas, and it may continue for a few days after the attack has passed off. The urine contains blood during an attack, but may be macroscopically free from it between them. The most characteristic symptom of an impacted calculus is a fixed pain, which is increased by exercise or jolting and relieved by rest. Its position depends largely on that of the stone. When the calculus is in the lumbar ureter, the pain is either felt posteriorly, or about one-and-a-half inches laterally from the umbilicus. The fixed pain of a stone in the pelvic ureter is close to McBurney's point, and often gives rise to the erroneous diagnosis of a chronic appendicitis. Pain in the iliac fossa may be associated with a renal backache. This indicates serious back pressure on the kidney. The urinary changes are generally slight. A gross hæmaturia may occur, but it is not as common as in cases of renal calculus. Pus and/or blood-cells are to be found in about 75 per cent. of cases, but usually they need the microscope for their detection.

Examination.—Physical examination is rarely conclusive. A pyonephrotic kidney is easily palpable, but this is a rare complication of a ureteric calculus. Tenderness over the kidney, the lumbar ureter, or the corresponding side of the bladder base is the most common finding, but it is not absolutely characteristic of stone as it is found in other conditions. A large calculus may be felt on rectal palpation in the male, and smaller stones may be felt on vaginal examination. On cystoscopy ecchymoses may be seen round the ureteric orifice a few days after a renal colic. Apart from this, gross changes are only observed when the stone lies in or near the intramural portion. They consist in varying degrees of œdema and redness round the orifice, which are much more marked when the urine is infected.

Radiography is the method *par excellence* of making the diagnosis, and if combined with intravenous pyelography gives most valuable information as to the state of the kidney. The ureter is not visible on X-ray films; the real position of an object throwing a doubtful shadow should always be verified. The lumbar portion descends vertically, and crosses the transverse processes of the lower lumbar vertebræ. Stones in this portion usually throw an oval shadow, with the long axis vertical. The axis when prolonged should cut across the transverse process above and below it. A stone in the middle of the pelvic portion usually throws a shadow about half an inch internal to that of the spine of the ischium. Its long axis is also vertical. After an injection of uroselectan-B, it is at once possible to see if the supposed stone lies in the ureter. It usually shows some dilatation of the ureter and calyces above the stone shadow. It also gives a fair idea of the renal function. Absence of excretion on the affected side is a serious sign. It shows that the kidney is either temporarily obstructed or permanently functionless. In the former case it may recover if the stone is removed without delay, in the latter it is an indication for nephrectomy.

Treatment.—This depends on the size of the stone, the amount of obstruction it causes, and the presence or absence of infection. A round or oval calculus about the size of a pea may be watched, unless the urine is grossly infected. It may be assisted down the ureter by cystoscopic dilatation. An elongated calculus the size of a date stone rarely passes naturally, and usually requires open operation. Operation is also indicated in all cases where there is serious risk of permanent damage to the kidney. This risk may be increased by injudicious administration of diuretic fluids. The operation is remarkably safe, and the risk of a recurrence is slight.

CALCULOUS ANURIA

This is a serious, but fortunately a rare occurrence. It is essentially an obstructive anuria, due to the presence of one or more stones in the upper urinary tract. There are four groups of cases (1) obstruction of both kidneys or ureters; (2) obstruction of the only functioning kidney; (3) obstruction of one kidney, its fellow being diseased; (4) obstruction of one kidney, its fellow being apparently healthy.

In the first group the stones usually lie in the upper portions of the ureters, and are comparatively small in size. In the second, one kidney may have been removed by operation, destroyed by disease, or congenitally absent. The obstructing stone usually lies in the upper ureter. The third and fourth groups are more difficult, and are usually described as cases of " reflex anuria ", though it is probable that the anuria is due to a fall in blood pressure.

Symptoms.—In the first two groups, the onset is painless. The patient, who usually gives a history of stone, finds that he is passing little or no urine. He may go on in a state of tolerance, which usually lasts for four or five days. During the greater part of this time he feels well, and but for the fact that he only passes an ounce or two of blood-stained urine per diem he has no symptoms. An examination of the blood, however, shows a very rapid rise in the blood urea. This symptomless period is followed by the appearance of uræmic symptoms. There is a distaste for food, a feeling of dryness in the mouth and tongue, dysphagia, and constipation with flatulent distension of the bowels. He soon becomes dull and sleepy. This deepens into coma, and ends in death. In the remaining groups, the anuria usually begins with an attack of renal colic, and often the secretion of urine begins again as soon as the pain passes off.

Treatment.—A ureteric catheter should be passed as soon as possible. Incidentally the passage of the cystoscope will show that there is no retention. If the catheter can be insinuated above the obstruction, there is usually a brisk flow of urine through it. It should then be left in place, and the patient given diuretic fluids. As much as 200 to 300 ounces have been collected through a ureteric catheter during the following day. Unless it is known that the opposite kidney has been removed, both sides should be catheterized. This method gives the surgeon time to prepare the patient for operation, and to determine the position of the stone by radiography. He should cut down on the stone as soon as the blood urea falls to normal. If the catheter cannot be passed, the kidney in which pain was last felt should be exposed and drained. If the stone is felt, it should be removed, but time should not be wasted looking for it. It is better to be content with draining the kidney and to remove the stone when the patient has fully recovered from the effect of the anuria. If the kidney first exposed is thought to be incapable of excreting urine, the patient should be turned over, and the opposite organ exposed and drained. The best results are obtained by catheterization of the ureters, but it is obvious that this can only be done in favourable cases.

VESICAL CALCULUS

Up to fifty years ago, stone in the bladder was a disease of the extremes of life. It was common in male children and old men. Now it is rare in children in this country. Out of 371 patients admitted to St. Peter's Hospital only three were under ten, and over half were between fifty and seventy years of age. Only five patients in this series were female. When there is no obstruction and the patient can empty his bladder completely, it is usual to find only one stone, but when there is obstruction, e.g. cases of enlarged prostate, diverticulum, etc., multiple calculi occur in over 70 per cent. of the cases.

Symptoms.—The symptoms in unobstructed cases are very characteristic. They are frequency of micturition, pain and hæmaturia. The increased frequency of micturition is most marked while the patient is up and about, but is relieved by rest. The result is that he is little troubled at night. The desire is usually imperious, and the patient must relieve himself at once, else some of the urine comes away in his clothes.

Micturition is associated with a characteristic pain felt near the tip of the penis, especially towards the end of the act. In many cases the urinary stream is suddenly interrupted by a particularly painful spasm. The urine only starts to flow again when the spasm passes off. In addition to the pain on micturition, any sudden jolt or jar is accompanied by a sharp cutting pain felt either in the urethra or the perineum. The hæmaturia is usually terminal. That is, a few drops of blood are passed at the end of each act of micturition. Occasionally the whole amount of urine may be bloodstained, especially if the patient is taking exercise. These symptoms are greatly modified when there is even a slight degree of urinary obstruction. The residual urine acts as a cushion, which protects the bladder wall from injury. The result is that there is little or no pain at the end of micturition. There may, however, be a dull ache in the perineum on walking, and a moderate amount of blood in the urine at the same time. If a catheter is passed, and the bladder is completely emptied, there is always the sharp cutting pain at the end of the penis, as in unobstructed cases.

The *diagnosis* is best made by cystoscopy. Radiography is uncertain, as a large proportion of vesical calculi are composed of uric acid, which does not throw any shadow. Grating felt with a catheter or sound is not always conclusive, and should be confirmed by cystoscopy.

Treatment. — An uncomplicated vesical calculus should be crushed. It is rare to meet with one that is too large to be grasped between the jaws of the instrument. The operation needs a considerable amount of practice, but when well carried out it gives excellent results. If an enlarged prostate is present, litholapaxy is an unsatisfactory operation, as it is often impossible to wash out all the fragments. The bladder should then be opened, and both the stone and the gland removed.

DISORDERS AND DISEASES OF THE URINARY BLADDER

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THE cystoscope is the special instrument for bladder investigation. It will come as a surprise to many that cystoscopy is so old a method of examination. As far back as 1880 Nitze, the originator of the modern cystoscope, had produced the lens system, and, there being no Edison electric lamp, had invented a remarkable and ingenious lamp consisting of a platinum wire rendered incandescent by an electric current. This lamp got so hot that a water cooling system had to be devised. But by 1885 the Edison lamp was available and very soon was applied for use with the cystoscope. The modern instrument therefore dates from about 1886. X-rays were discovered in 1895 and within a year or two were being applied to the diagnosis of urinary calculi, so that cystoscopy antedates radiology as a means of urological diagnosis by ten to fifteen years. It is indeed a little surprising to recall that in 1895, before radiology was available, urologists were employing wax-tipped ureteric catheters in the diagnosis of ureteric stones. The waxed end was passed up the ureter through the cystoscope to receive on its smooth exterior the scratches produced by stones impacted in that tube. The full recognition of the value of cystoscopy and the acquisition of capacity to use it are of considerably later date. Yet cystoscopy is not difficult except when advanced pathological changes complicate the procedure and this is happily the case in a relatively small proportion of patients.

The bladder is a favourable site for endoscopy. Access is reasonably good and the walls of the cavity are not remote nor difficult to visualize. When filled with 200 c.cm. of lotion—the customary quantity—the viscus will occupy the room of a medium-sized orange so that if the prism is centrally placed within the cavity it is not more than one-and-a-half to two inches distant from any part of the periphery. This makes visibility good for three reasons :—

(1) The lamp lies close to the object illuminated and therefore lighting is good.

(2) The prism approximates to the mucosa, and the optics of the telescope are such that this feature gives good magnification, the optimum working distance being about three-quarters of an inch.

(3) Little bladder lotion intervenes between the bladder wall on the one hand and the prism and lamp on the other. This is not an important point when the working conditions are good, but when the medium contains much blood or pus, the less fluid intervenes the better.

But in actual fact the cystoscope, following the natural line of the urethra in the female and of the straightened out curve of the urethra in the male, comes to occupy a position which is even more advantageous than the one indicated. This position, known as the *primary*, is such that the cystoscope shaft lies at a convenient level above the bladder base. At the point of entry of the cystoscope, the internal meatus, the bladder base and the cystoscope are practically in contact but the two diverge gently so that when the inter-ureteric bar and the bas-fond are reached a distance of three-quarters to one inch separates them. This, the optimum examining distance, is called the " canonical distance," and at it the image is about twice the size of the object viewed. By rotating the cystoscope over so that its prism faces the bladder floor, it will be found to be working at this best of all distances. Moreover, it is here that the chief objects of interest are situated. Here lie the ureteric openings, capable of reflecting morbid change in the kidney and conveniently placed for the observation of bloody or purulent effluxes, the outflow of indigo-carmine for renal function testing, and at hand for catheterization. The main bladder lesions also show a preference for this situation. Stones, purulent deposits of blood gravitate to the bas-fond, papillomas have their most usual site of origin in the area surrounding the trigone and the same region is the one where the orifices of diverticula are to be discovered.

CYSTITIS

When a patient presents himself with symptoms suggesting cystitis many questions arise, some of which must be decided by radiology, pathology and cystoscopy, but much information can be gained by simple and direct clinical methods, one or two of which will be outlined, assuming that stones, new growths and other complicating factors will be excluded by the appropriate means.

The onset.—Is this a new and recent infection or an exacerbation of an old standing one? The history often gives as accurate an indication of the type of the cystitis as other means. The pathological and cystoscopical examination may indeed mislead in this respect. Often the cystoscopic findings bear no relationship to the severity of the symptoms. Thus an almost normal-looking bladder is regularly found in a patient with severe dysuria and on the other hand a deep red velvety mucosa in a comfortable patient. If the onset was sudden the disease is probably attributable to one of the common non-specific pus-forming organisms. If it was insidious the tubercle bacillus comes into mind as a possible cause. The insidious onset with the steady progression in severity until ultimately a degree of frequency and irritation is reached in excess of that usually witnessed in the ordinary simple varieties is characteristic of tuberculosis.

The onset in a severe attack of *Bacillus coli* cystitis is sudden. After the first uncomfortable act of micturition the patient, usually a female, finds it necessary to pass water every few minutes, generally with considerable pain. A drop of blood is squeezed out at the end of the act, and here it may with advantage be remarked that this is one of two exceptions to the rule that patients with hæmaturia should be cystoscoped. The source of this hæmaturia is obviously the engorged mucosa of the bladder, blood being expelled by the painful bladder spasm which compresses the swollen mucous membrane. Patients with spontaneous cystitis at this stage should not be cystoscoped; the other exception is the hæmaturia of nephritis, always assuming that the cause can be correctly assigned.

The reaction of the urine.—There are three organisms which grow in an acid urine—the *Bacillus coli communis*, the gonococcus and the tubercle bacillus. All the others prefer an alkaline habitat, though they may tolerate an acid one. By the simple act of taking the reaction of the urine therefore at the first interview it is possible to divide the causative organisms into two groups which can at leisure be further worked out by the pathologist. Moreover, as each group thrives best in its own medium, medication can be begun immediately by changing the reaction of the urine. It is assumed that the patient is not taking a drug likely to alter the reaction, that the urine is freshly passed, and that its reaction is not interfered with by the alkaline tide.

Cystitis with an acid urine.—Of the three organisms mentioned above as preferring an acid medium the gonococcus is identified by the two-glass test. The first glass contains pus or threads swept from the urethra which are characteristic and show, according to their type, a recent or an old standing urethritis. As a rule the second glass will be clear and free from pus. The pyuria thus originates below the bladder and if a third glass is taken following prostatic massage it will probably show prostatic catarrh and so confirm the diagnosis.

Cystitis of insidious onset and persistent progress, resistant to treatment, leads to the suspicion of a tuberculous origin and in this particular disease the discovery of the bacillus is exceptionally important. Tuberculous disease of the urinary tract in the great majority of instances first becomes manifest by the severe and irritating cystitis which allows the patient no rest day or night. Yet it is not to be thought of as a bladder disease for the bladder involvement is invariably secondary to tuberculosis of some other organ and usually of the kidney. The cystoscope shows a severe cystitis and a bladder much reduced in capacity. The actual tubercles and the tuberculous ulceration which are popularly thought to characterize the disease cannot by any means always be seen. Frequently the bladder changes are present only around one or other ureteric meatus or are specially pronounced there, a fact suggestive in itself. By this indication, confirmed by renal function tests, ureteric catheterization and pyelography, the focus of original disease is discovered. If, as is usually the case, it is unilateral, the removal of the diseased kidney will in a large proportion of the cases lead to spontaneous recovery of the bladder.

Infection with the colon bacillus runs a variable clinical course. So often an attack is merely a relighting of old trouble, the organism having been identified previously. A first attack of " spontaneous " and acute cystitis occurring with an acid urine, having the characteristic odour, especially if the pus is finely particulate, may be confidently labelled as due to the *Bacillus coli*. The first step is to alkalinize the urine, a procedure which gives prompt relief. This alkalization is merely directed to the alleviation of symptoms and is not curative, for the inhibitory effect of an alkaline urine on the *Bacillus coli* is negligible (Anson

Jordan). This is a fact which is insufficiently known in the profession. As soon, therefore, as some symptomatic improvement is seen, a sudden turnover is made to an acid regime and the administration of hexamine. This promptly causes an increase of urinary discomfort and frequency of which the patient should be forewarned as otherwise he will assume that the trouble has relapsed and will suffer disappointment. Alternating periods of acid and alkaline medication are to be recommended as the patient is rendered more comfortable under alkalis and his general health improves, partly because he gets more rest at night. Moreover, the acid toxæmia of a severe case is benefited by alkaline medication. Yet the acid plus hexamine periods are those which have most effect in destroying the invading organism.

Organisms living in an alkaline medium.—When the urine is found to be alkaline, and especially if it is strongly alkaline, an attempt is made to render it acid. For long the standby for this purpose has been the acid phosphate of sodium, the salt responsible for an acid urine in health. Recently other methods have been introduced, particularly the ketogenic diet and mandelic acid. The latter in particular has proved itself valuable. If the urine can be rendered strongly acid the result will probably be satisfactory because hexamine can then be employed. This drug, a compression product of ammonia and formaldehyde, is split in the presence of an acid so as to liberate the formalin which is the only effective antiseptic component. As the quantity of formalin liberated depends on the pH of the urine the importance of getting good acidity is obvious. Yet it is astonishing how frequently it is prescribed with citrate of potassium or other alkali.

If the urine cannot be rendered acid the problem is more unfavourable. But the reduction of the alkalinity of the urine is in itself worth while as it retards decomposition and checks the growth of organisms.

In these circumstances caprokol, which was introduced to act irrespective of acidity, may be valuable. Proflavine (0·05 gm. in a capsule) may be prescribed for short periods (two or three days; its prolonged use is inadvisable) and certain proprietary preparations of which cystopurin, pyridium and neotropin are the most popular may prove helpful.

Vesical lavage is capable of giving great assistance, especially in cases of long-standing alkaline cystitis. It should not be used in the acute phase nor without the careful exclusion of tuberculosis and should not be employed till other types of treatment have failed. In either sex it can be carried out by the catheter and syringe but in the male the " grande lavage " of Janet is an excellent means of introducing lotions into the bladder. This procedure, originally introduced for the treatment of posterior urethritis, relies on a five-feet head of medicated fluid connected to the urethra by a nozzle, and the pressure thus produced overcomes the resistance of the vesical sphincter so that the lotion enters the bladder.

DIVERTICULA

Diverticulation of the bladder is now known to be quite common. In pre-cystoscopic days little was known of these interesting pouches except as post-mortem curiosities. A vesical diverticulum is a protrusion of the bladder mucosa which has herniated through the musculature. The sacs themselves vary much in size; some have a capacity of a drachm or less, others are capable of holding many pints of fluid. The large ones are rare but diverticula of about the size of a tangerine orange are frequently seen. The diagnosis is made with the cystoscope, as symptoms are absent or anomalous. The orifice is seen as a deep, black hole in a trabeculated bladder. Its size is fairly constant, appearing to be a little larger than would comfortably admit a lead pencil, and it does not increase with increase in the size of the sac itself. The majority of openings lie in that section of the bladder which abuts on the trigone and they are multiple in 50 per cent. of cases. Their mouths are surrounded by a thick ring of muscle over which the mucosa dips into the unlit depths beyond. The size of these sacs cannot be discovered by cystoscopy but, if the bladder is filled with some radiologically opaque solution, the sac can be seen on a plate exposed at a suitable angle. Diverticula of moderate or large size may cause obstructive symptoms similar to those of prostatic hypertrophy. This they probably effect by extending down beneath the trigone and distorting the vesical outlet. Prone to infection the residuum in these cavities makes the sepsis difficult to treat. Small diverticula and those which are not responsible for symptoms should be left undisturbed. Those which call for operative treatment are for the most part best reached by stripping the peritoneum from the bladder and turning that viscus forwards, when they are exposed on its dorsum. They often extend between the bladder and rectum and may be adherent in inaccessible positions.

NEW GROWTHS

Of bladder neoplasms only those springing from epithelial elements claim attention, all others being rare. Growths covered by villi are the commonest and these show considerable diversity in their clinical and pathological characters, this diversity being specially important in that it affects their grade of malignancy. Most growths, even those apparently quite simple, eventually undergo malignant change if untreated, but many are truly carcinomatous from the start.

Symptoms.—It is hæmaturia which first calls attention to the existence of a papilloma in the bladder in approximately ninety per cent. of all cases, and the more benign the growth, the more probable is it that hæmaturia will be the first symptom. The alternative onset symptoms are pain and frequency of micturition. Both of these may be accounted for by obstruction and this in its turn may be caused either by clots or by the impaction of fronds in the urethral meatus. Cystitis is another cause both of pain and frequency and as the malignant bladder is unduly susceptible to infection following instrumentation or apparently occurring spontaneously, cystitis should suggest malignancy.

The sudden and unexpected appearance of blood in the urine, generally unaccompanied even by the most trivial discomfort or abnormal sensation and only recognized by the discolouration of the urine, is a fact to which different patients and indeed different medical attendants react very variously. To some it is a most disquieting event, others take it philosophically or ignore it completely. To those engaged in urology true symptomless hæmaturia demands immediate cystoscopic investigation and I always emphasize the importance of carrying out this inquiry without delay. The cystoscopy has a two-fold objective—it must identify (1) the anatomical origin of the bleeding and (2) its pathological cause. To take the anatomical source first, most symptomless hæmaturia is of bladder origin, but not all. If the blood has a vesical origin the lesion responsible for it will remain when the bleeding stops, and it will be there to be seen at whatever time the cystoscope is used. As a matter of experience it is found that a bladder neoplasm is the most usual finding and the provisional diagnosis when a patient presents himself with symptomless hæmaturia is a neoplasm of the urinary tract and probably of the bladder. If it was known for certain that it was coming from the bladder the time of cystoscopy would be relatively unimportant; but in one patient out of four or five it comes from the kidneys and every attempt should be made to determine the anatomical origin without loss of time. The point under emphasis is that to see blood coming from a ureter, cystoscopy must be performed during the actual bleeding. No attempt should be made to stop the bleeding by rest or otherwise but the patient should be cystoscoped forthwith. Once the bleeding has stopped he is very liable to refuse cystoscopy until there is further hæmaturia, an event which is sometimes long delayed. In malignant disease much valuable time may thus be lost and the neoplasm may even become inoperable.

The cystoscopic features of papillomas vary enormously. A small benign growth, little larger than a pea, is a common picture. Ninety per cent. of these early growths are discovered in an area of bladder which immediately surrounds the trigone, the majority being around the ureters or behind inter-ureteric bar. Here they are not only easily examined but easily treated. They are beautiful objects covered with delicate, mobile villi which float freely in the bladder lotion. The benign ones are attached by a thin pedicle the base of which is quite mobile on the site of implantation. The appearance of the papilloma witnesses for or against malignancy. Fine, tenuous villi, a long thin pedicle and the absence of thickening at the point of implantation indicate a benign growth. Short, stunted, coarse fronds, a stumpy or sessile growth, thickening and especially œdema around the tumour's base indicate malignancy.

Growths which had originally the appearances of simplicity change into malignant ones as they age, their villi become stunted, swollen and less transparent, and their general habit squat and sessile. Infiltration of the deeper planes of the bladder takes place at some stage, but the stage is variable and is not always easy to recognize with the cystoscope, partly because the fronds overhang the implantation area. Secondary splashes are frequently seen and appear to be implants from the original neoplasm. Some authorities regard multiplicity as indicating malignancy. It certainly seems to occur with the freely-growing types, but its malignant signification is not proven. Bruising and injury to the main growth favour dissemination, a fact which should be borne in mind during cystoscopy. A favourite site for secondary buds is the region of the bladder outlet and it is probable that they become engrafted here when the original papilloma comes into relationship with the meatus during micturition and possibly gets sucked into it by the outgoing stream of urine.

Treatment.—The treatment of small papillomas is undertaken through the catheterizing cystoscope. The active electrode from a diathermy machine is introduced through the catheter barrel, the inactive electrode being in contact with sacrum or thigh. Under vision one area after another is blanched and destroyed, and falls on to the bladder floor or comes away on the metal end of the electrode. Periodically the resulting debris is removed from the bladder by lavage and the burning is continued. Small papillomas can be destroyed in one sitting, larger ones in two or more. When a really large growth comes for treatment it is better practice to use the open approach as the per-urethral route involves too many sessions and too prolonged treatment. A growth approaching the size of a golf ball can be treated per-urethrally, especially if of the non-compact type. Above this size I recommend the suprapubic approach.

For open operation good exposure must be ensured by free incision of the parietes and bladder wall, and by using the Trendelenberg position. The one thing important above all others is the avoidance of transference of tumour cells either to other parts of the bladder or to the wound itself, and this can easily happen. In either place they form new tumours, but in the latter they take on malignant characters and eventually kill. Every care must therefore be exercised to avoid this tragedy. The wound margins are protected with tetras wrung out of silver nitrate lotion (1–5000), the bladder incision is kept from collapsing down into the bottom of the pelvis in such a manner as to allow extrusion of a large papilloma into the wound and the bladder lotion is removed gently by suction, contact with the growth itself being avoided. Instruments used in the bladder are kept from subsequently touching the extravesical tissues.

The old way of removing a papilloma with scissors or a scalpel is now obsolete as it is prone to produce implants. The neoplasm is first subjected to diathermy which devitalizes the whole exposed surface of the growth to some depth, say half an inch. The diathermy button is now replaced by a wire loop and the current changed to the endothermy (cutting) current. Loopfuls of dead neoplastic tissue are scooped away with this instrument and the periphery of the tumour is thus removed. When deeper levels are reached the diathermy is again used, followed once more by the cutting loop until the whole growth has gone. Examination of the implantation site and judicious diathermy to it, perhaps with a needle point, complete the destruction of the papilloma. The procedure described above is admirable in its results and is suitable for large benign tumours or those which are awkwardly situated for the cystoscopic operation.

Infiltrating growths when operable call for partial resection of the bladder. The viscus is stripped of its peritoneal coat and mobilized in the pelvis. As the majority of growths involve the region near the trigone one or both ureters must be divided and reimplanted. Total cystectomy is a severe operation but one the technique of which is improving; the ureters are transferred to the rectum. Radium is somewhat uncertain in its effects on bladder growths. It may be introduced through the cystoscope, but more massive and better distributed doses are possible by open suprapubic operation.

DISEASES OF THE PROSTATE

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THE ever-increasing interest centered around those changes in the prostate gland which are so commonly seen as the accompaniment of advancing years, is considered to be sufficient reason for devoting the majority of this article to this subject. In discussing what is meant by the term " enlarged prostate " it is obvious that the malignant prostate is excluded, for here is seen a carcinomatous structure (very rarely sarcoma) of a type commonly found in secretory glands throughout the body, the adeno-carcinoma, though showing a larger deposit of inter-acinous fibrous deposit than in the majority, with the exception of scirrhus mammæ. The enlarged prostate, other than carcinoma, continues to receive a number of designations because the pathology of it is as problematical as ever.

The names in everyday use, "hypertrophy," "adenomatous prostate," and " senile enlargement," all have their justification, yet each is open to criticism. "*Hypertrophy,*" the oldest term, calls for respect from its antiquity, and justification, since the alteration of the gland may be in little else than in size, until examined microscopically, and even then, the resemblance to the original gland is often striking. The objection is upon logical grounds, for it is unreasonable that a sex gland should undergo hypertrophy at that period of life when sexual activity is in marked decline. It cannot be denied, however, that a high vascularity, so often noted by the surgeon to his cost, points to some form of functional activity, another problem which may eventually be elucidated by endocrinology. Perhaps, to-day, the majority of surgeons prefer the term "*adenomatous enlargement*" because many of the glands removed present encapsuled tumours, in fact the gland may be a collective mass of such tumours, bearing a striking resemblance to adenomas of the breast or thyroid; very often cystic changes are to be seen.

"*Senile enlargement*" is, generally speaking, a safe term, but senility is not always responsible. The wider adoption of cystoscopy as an aid to urological diagnosis has revealed a high incidence of early prostatic enlargements even in the third and fourth decades, enlargements, however, which could not with certainty be recognized on rectal examination. That the onset of prostatic symptoms had occurred in relatively early life is perhaps supported by a remark often made by patients suffering from proved prostatic obstruction, that they had never passed water with a good stream so long as they could remember, but that, after prostatectomy, it was obvious that the stream was better than it had been all their lives. My youngest patient, the victim of acute retention from an enlarged prostate, was aged 43; I enucleated a gland as large as a tangerine orange. In this country the average age of patients requiring surgical intervention is 68. The figures of Collings (of New York) would point to a lower age incidence in America, for he had occasion to carry out a transurethral operation upon 80 cases, of whom the average age was 54.

ETIOLOGY

Horse-riding and venereal disease have, in the past, been held to be causative agents, but without reason. Gonorrhœa may cause a fibrosis of the gland which may ultimately lead to urinary obstruction. The "adenomatous" enlargement is more common among those who follow a sedentary occupation, and conspicuously more common among the intellectual classes. I have been surprised to note the low incidence in three London Municipal Hospitals, in which patients come under my personal supervision; the frequency among the clergy in another institution under my care is equally striking. Celibacy or the reverse appears to have no bearing. That gonorrhœa is a causative factor in "adenomatous" enlargement is disproved from the extremely rare association of stricture urethræ with this form of enlargement. Finally, is it eventually to be proved that a hormone, sex or otherwise, is the etiological agent?

Possibilities of endocrine balance in the control of prostatic development.—It is too early yet for any expression of opinion to be made upon results of research. Fortunately many of the lower animals, monkeys, dogs, rats and mice, not only possess prostates, but in dogs, at any rate, pathological enlargement is common; therefore there is ample material for biological experiment. Prostate development appears to be influenced not only by hormones manufactured in the male, but, and even more conspicuously, by the œstrogenic hormone from the ovary. Pituitary and testicular hormones have been ascribed functions. The anterior lobe pituitary product, prolan, appears to serve as the higher control balancing the action of hormones of the testicle, of which two are thought to be secreted, one, formed by the cells of Leydig, which stimulates development of accessory sex glands, including the prostate, the other by germinal epithelium of the testicle, and this is believed to exercise an opposite effect. Lower succeeded in producing enlargement of the prostate by injecting rats with prolan, others prevented development of the prostate by removing the anterior lobe of the pituitary. A further evidence to support the hormone relationship of the pituitary to the genitals is the hypertrophy of the pituitary following castration. Why folliculin, the œstrogenic hormone of the ovary, should so stimulate prostatic development is not easily explained on logical grounds; this substance may also be isolated in the male. It has further been demonstrated that benzoate of folliculin may cause a cancerous growth in the prostate, but not, apparently, if given in conjunction with the testicular hormones. A fair conception of this interesting new chapter of medical science may be gained by study of a paper by S. Zuckerman[1]. The whole subject of endocrine control of the prostate is summarized and reference is made to recent research which led to present-day knowledge.

PATHOLOGICAL ANATOMY

A full account of the changes taking place in the prostatic urethra, and at the bladder neck and base, would be out of place in this communication. There are, however, one or two points worthy of consideration, especially in view of the wave of interest in transurethral operations of recent years.

How does the prostate obstruct?—Looking back into the past little, apparently, was known of changes in the bladder-neck region until the anatomy of prostatic enlargement was studied by John Hunter. Subsequent writers, Everard Home and Guthrie, introduced differences of opinions. To-day it is recognized that bladder-neck obstruction is caused by the prostate gland in a multitude of ways. (1) By intravesical projection of the middle or lateral lobes in a valve-like fashion. (2) By pressure upon the prostatic urethra by extravesical enlargement of the lateral lobes (adenomatous, fibrotic or carcinomatous). (3) By a bar at the bladder neck, which on histological examination may be found to be fibrotic or glandular. (4) By a tight contracture at the bladder neck, as though due to a permanent sphincter spasm.

In studying pathological anatomy it is important to call attention to what is often a barrier to the passage of a catheter, why, in fact, the coudé, or similar instrument, is necessary. The obstruction is sometimes due to irregular projections into, or lateral compression of, the prostatic urethra by the actual alteration in the gland itself. A careful study of an enucleated gland causing such obstruction as that to which attention should be drawn will show, in the middle line of the prostatic urethra, a ridge and on either side a depression which may even be a deep pocket, limited above by a horizontal shelf. The pocket may receive the point of an instrument and hold it firmly. If the instrument be a rigid one and force is exerted, it is easy to see how penetration into the substance of the gland may take place. The gland may be transfixed and the point of the instrument may enter the retroprostatic pouch. In one case of my series I actually found that an in-dwelling catheter, which had been tied in for several days, had drained the bladder satisfactorily in spite of its vicious course (Figs. 1 and 2). This reference will serve as a reminder of the necessity for selection of suitable instruments, and the especial need for gentleness; the majority of cases would not proceed so favourably as the one referred to above, where rapid recovery followed suprapubic prostatectomy. One other point to remember is the occasional great length of the prostatic urethra, and the necessity, in these cases, for an especially long catheter, either to relieve retention or to prove the quantity of residual urine.

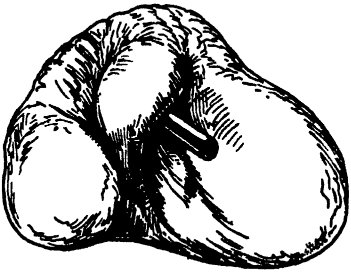

FIG. 1.—Anterior view of the gland laid open after enucleation to expose prostatic urethra. The point of entry of a catheter is indicated by the position of the glass rod.

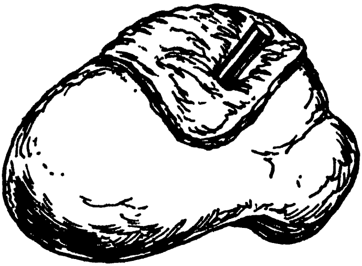

FIG. 2.—Posterior surface of the same gland as in Fig 1. The point of exit is marked by the glass rod. (Drawings of a specimen in King's College Hospital Museum.)

PHYSICAL EXAMINATION

This includes (*a*) digital examination; (*b*) passage of catheter or bougie; and (*c*) endoscopy: (1) cystoscopy; (2) cysto-urethroscopy.

(*a*) *Digital examination of the rectum.*—The knee-elbow position is in most cases preferable, and an attempt should always be made to encourage the patient to relax the abdominal muscles to allow of a bimanual palpation. Typically, the simple adenomatous enlargement may be revealed as a part of a spherical mass of homogeneous elasticity and bisected by a vertical sulcus. The margins are moderately circumscribed, including the upper edge, and the lower pole is, as a rule, defined. The detection of mobility is greatly aided by bimanual examination. Variations from the above are many.

(1) Firmer areas here and there may be due to separate adenomata; a hard fixed area will suggest carcinoma.

(2) A homogeneous flat resistance is felt instead of an elastic swelling. This suggests a thickening of that dense fascia which separates the prostate from the rectum, its density excludes definition of the margins of the gland. Some difficulty may be experienced in distinguishing an adenomatous from a malignant or fibrotic gland, if this fascial barrier exists.

(3) A circumscribed firm, yet slightly mobile swelling presents where the fibrotic gland is under observation.

(4) A definite crepitus may be felt where prostatic calculi are massed in a pocket in one or other lateral lobe.

(5) Very little of the gland may be palpable, yet intravesical projections or a " tight internal meatus " may exist sufficient to cause urinary retention.

(6) The carcinomatous prostate is typically stony-hard, nodular, markedly fixed and its boundaries ill-defined. The inter-lobular sulcus is usually not to be felt. Superiorly it is not uncommon to note a firm horizontal ledge, perhaps bilateral, and due to carcinomatous extension in the seminal vesicle, or massively involving the lymphatic channels. Occasionally a stone lodged at the bladder neck may be mistaken for a malignant gland. In cases of doubt an X-ray examination should be carried out.

N.B.—Before making a diagnosis, especially when a large, soft adenomatous gland is thought to be present, it is essential to know the degree of bladder distension. A thickened distended bladder may be almost indistinguishable from a soft, elastic gland; passage of a catheter will usually dispel doubt, and confirm the nature of what was discovered digitally.

(*b*) *Passage of catheter or bougie.*—This is sometimes a necessity to exclude stricture urethræ as the cause of dysuria. A stricture deep in the bulb can confuse even the expert. A prostatic obstruction often offers less resistance to large than to narrow instruments. Passage of the coudé or bi-coudé catheter, or the fully curved steel bougie, with full depression of the shaft between the legs, are valuable aids to differential diagnosis, indicating that the obstruction is prostatic. When the catheter is used to measure residual urine, if this has not previously been done, it is wiser to refrain from drawing off more than twelve ounces forthwith; the catheter should be tied in and arrangements made for slow emptying. A rigid instrument will sometimes help in diagnosis of carcinoma: here there is a peculiar gripping, preventing the normally free movement, and this can be more accurately recognized during general anæsthesia.

(*c*) *Endoscopy.*

(1) *Cystoscopy.*—The contour of intravesical projections may be studied with great accuracy, and a consideration of their size will assist in deciding the nature of operation. The prostatic bar is easily seen, but difficulty may be experienced in recognizing the tight internal meatus. Secondary changes in the bladder will be noted, trabeculation, sac-formation and diverticula, cystitis, stones. The cystoscope will aid in differential diagnosis, especially stones, bladder neoplasms and a "nerve bladder" (usually tabetic). The intravesical projections are seen with adenomatous glands as broad fleshy undulations overlaid by a smooth stretched mucosa, unless inflammation is present, when the mucosa is œdematous and bleeds easily. The appearance is different in carcinoma, the projection is regular, a horse-collar projection, the surface of which may be rippling (as distinct from the large waves of adenoma), and there may be œdema of a cystic type, which is rather characteristic.

(2) *Cysto-urethroscopy.*—This will only be necessary in contemplation of a transurethral operation; the degree of encroachment of the lateral lobes into the posterior urethra will be well demonstrated.

SYMPTOMS

The earliest indications of the enlarging prostate are insidious in onset for the most part, yet every now and then cases are met in which acute retention has been foreshadowed by, so the patient alleges, no indication of trouble to come. Among the complaints which arouse suspicions are:

(1) *Obstruction,* i.e. a minor alteration in the stream, which diminishes in size, strength and continuity. A little hesitancy in

beginning is often noted, which is worse in the early morning and if there is a night rising. During the day normal micturition may be enjoyed. There may be considerable difficulty in micturition if urine had been held too long.

(2) *Irritation.*—Some increased frequency by night, more than by day. Urgency.

(3) *Hæmorrhage* may appear in one of three ways. (*a*) As hæmaturia, when the blood may, in severe cases, be intimately mixed with the urine, and even clotted; in less severe it may be noted to be in excess at the commencement or termination of the act of micturition. (*b*) As an escape of blood per urethram independent of micturition. (*c*) As hæmospermia. Hæmorrhage is more prone to occur, and to be excessive, in cases of extravesical adenomatous enlargements, than in fibrotic or carcinomatous glands. A severe hæmorrhage, even great enough to cause clot retention, may be the first indication of prostatic disease, and may follow such indiscretions as excessive banqueting, sexual indulgence or violent exercise.

Progress is inconstant with every type of enlargement. No pathological state reveals a wider variety of clinical manifestations and symptoms. Even the carcinomatous gland, which tends to pursue its course with relentless regularity, presents vagaries which are unaccountable, not the least conspicuous of which is the persistence of almost unaffected micturition in the presence of a gland so large as, by its pressure upon the rectum, to cause intestinal obstruction. Commonly, too, the malignant gland is presented clinically only by the effects of its metastases, (*a*) by pressure upon veins or lymphatics giving œdema of legs, (*b*) by nerve pressure, directly upon trunks, or secondarily upon roots, through bony (vertebral) deposits. The advancement of symptoms in the life history of a prostatic subject, though typically erratic, tends to be revealed as a steady development of those three groups already set down, (1) obstruction, (2) irritation and (3) hæmorrhage.

TREATMENT

Catheter life has to-day fallen into the background, for experience teaches that the majority of those who, through constitutional disability, are unequal to the strain of prostatectomy may yet be given the blessing of voluntary micturition with the aid of the modern endoscopic operations. The remainder, who cannot, or will not, undergo transurethral surgery are, for the most part, able to live a more comfortable existence if permanent suprapubic drainage is established in them. Each year it becomes more obvious that the necessity for advising a catheter life becomes markedly lessened. The very aged and very debilitated victims of greatly enlarged, adenomatous glands are the principle exceptions. It is fortunate that in this group, catheterization is often easy, for the size of the gland would necessitate very extensive transurethral resection, an operation not without danger; further, subjects of great glandular enlargement, especially if intravesical, are not suitable for permanent suprapubic drainage, since the bladder space is flattened antero-inferiorly, the tube thus impinges against the bladder floor, giving rise to bladder-spasms and penile pain.

Such a preamble to a discussion upon treatment would suggest that the radical is being considered as the primary measure to adopt. Such an idea should be at once dispelled. Those who have had opportunities of studying vast numbers of prostatic subjects through many years, and especially of observing individual examples for five, ten, fifteen or more years, cannot fail to be struck by the high percentage of those whose state remains stationary, retaining just their one, occasionally two, night risings, and a moderate hesitancy. Two reasons only can be raised in favour of immediate prostatectomy:

(i) 16 per cent. of all supposedly simple prostates are found histologically to present cancer or a pre-cancerous state (this figure has been admitted by several well-accepted authorities).

(ii) To remove the trouble, "once-and-for-all" whilst the health is good and constitutional qualifications for operation are unquestionable.

What, therefore, are to be the factors in the choice of treatment to be recommended to those suffering from non-malignant enlargement of the prostate? Here is a peculiar problem, for the surgeon is not dealing with an abnormality which surgery must remove, otherwise disaster must follow, as, for instance, is the case in papilloma of the bladder. Undoubtedly the choice is most difficult in non-obstructed cases, hence the first step in selection of treatment is segregation of obstructed from non-obstructed subjects, by catheterization to measure residual urine.

A. Treatment where no residuum is to be found.—In the main, a wise course will be to treat these patients symptomatically. This group may exemplify any or all of the cardinal symptoms in a major or minor degree, obstruction, irritation or hæmorrhage.

Obstruction.—In spite of a catheter failing to find a residuum, the patient under examination may have been the subject of one or more attacks of acute retention and, even in the absence of these may, for some unaccountable reason, reveal evidence of renal deficiency, clinically or on laboratory tests, although there is no reason to suspect any form of nephritis, on the evidence of albuminuria, casts in the urine or cardiovascular phenomena. Obstruction in this group, however, is usually of a mild type, and, except for causing situations of embarrassment from hesitancy, and inability to complete voiding in the usual time, may be ignored. A mixture of potassium citrate and belladonna is of help at worse periods. A healthy subject from 55–70 years of age, especially if there have been attacks of acute retention, should, if rectal examination reveals a large, adenomatous gland, be advised prostatectomy. If the gland is, rectally, small, but, cystoscopically, reveals a not-too-large intravesical projection, endoscopic resection would probably be preferable. Above the age of 70 endoscopic measures should take prior place in operative selection.

Irritation.—Increased frequency, with, perhaps, painful micturition. (i) A urine examination is all-important to investigate (*a*) reaction (hyperacidity is a common cause); (*b*) specific gravity, polyuria from chronic nephritis, excessive fluid intake, notably alcohol, may be to blame; (*c*) microscopy, e.g. pus, bacteria, crystals, indicative of cystitis, prostatitis or stone. (ii) X-ray examination for vesical or prostatic calculi. Rectal examination may reveal any type of prostatic alteration. Bladder sedatives, e.g. pot. cit., sod. bicarb., tinct. hyoscyamus, are generally useful, and if frequency is worse by night bromides given early in the evening are helpful. During very severe periods a mixture of ext. ergotæ liq. 20 minims, pot. cit. 15 grains, tinct. opii. 7 minims, aq. chloroformi to the ounce, will be found valuable. In those cases yielding little, if at all, to such medical treatment, operation may be the only measure to procure relief, and nothing short of prostatectomy will suffice. Electro-resection seldom relieves increased frequency in the absence of urinary retention, as is only to be expected.

Hæmorrhage.—The degree will indicate the course of action, but cystoscopy is essential in the endeavour to localize the bleeding to the prostate. Renal hæmaturia, and a multitude of bladder lesions which might bleed, may thus be excluded. Small hæmorrhages are of no consequence. Worse attacks may be treated by rest in bed, abstention from alcohol and a full diet, free purging and the administration of hæmoplastic sera, coagulen Ciba, etc. A high blood-pressure may be a factor in causation and should be suitably treated. In more severe cases, bladder washing with silver nitrate solution 1 in 10,000, or weak adrenaline, may succeed, and the in-tied catheter may, with advantage, be employed for purposes of irrigation with styptics, as well as to keep the bladder empty, thus diminishing congestion, as well as aiding contraction of the bleeding vessels. Rectal examination usually reveals a large, soft prostate; the cystoscope will show an oozing surface rather than a bleeding point. The more severe cases will necessitate operation, (*a*) suprapubic drainage, as an urgent measure, in the elderly or debilitated; (*b*) suprapubic prostatectomy, in more robust subjects. Endoscopic resection may succeed, but, generally, the type of gland which bleeds is better removed altogether. Resection might fail to include the actual bleeding area.

B. Treatment when a residuum of never less than four ounces is found.—In this group secondary renal effects must always be the controlling influence in choice of treatment; when once a residuum of this amount has become established a more rapid downhill progress is to be feared. The larger the residuum the greater the threat to kidney integrity. The presence of a considerable residuum at once introduces the question of more radical measures. For general glandular enlargements prostatectomy (one or two-stage) remains the procedure of choice in this country, especially for adenomatous glands or for those in which calculi are embedded. For fibrotic glands, intravesical projections (if not too large), the prostatic bar and the " tight internal meatus," electro-resection appears adequate. In this group therefore it is unnecessary to sub-divide treatment according to the three common groups of symptoms. Urinary retention is the factor which must be overcome. A catheter life or permanent suprapubic drainage will be necessary when the constitutional state forbids a direct attack upon the gland.

RELATIVE MERITS OF PROSTATECTOMY AND TRANSURETHRAL SURGERY

Some allusion has already been made to the solution of this question. Five years ago, in this country, to admit to practising endoscopic resection almost amounted to a confession. To-day there are few urological surgeons who do not include it in their every-day routine. In America the pendulum has swung considerably further. For instance at the

Mayo Clinic, in the last two or three years, approximately 98 per cent. of all cases are treated transurethrally. In the United Kingdom, where the customary conservatism is retained, case selection dominates the picture. In this end, not only is a most careful clinical study of the individual case essential, the ability of the surgeon to assess the architecture of the bladder neck, cysto-urethroscopically, is even more so. Hence this operation should be attempted by none but the most expert and experienced cystoscopists. There is no more dangerous operation in the hands of the beginner.

Transurethral operations.—The popular operation practised in this country to-day, electro-resection, is the outcome of the work of a large body of surgeons and instrument makers. It owes its success largely to the discovery of Edwin Beer, of New York, in 1910, that the diathermy current would coagulate as well immersed in water as in the open air. Thus was eliminated the greatest danger of the punch and of all other endoscopic operations, hæmorrhage. Although the instrument so widely used throughout the world to-day is of American origin, and bears the name of an American urologist, McCarthy, it must be noted that Kenneth Walker, of London, deserves a considerable share in the credit of its development, for it was he who established the value of the bakelite sheath. Briefly, in this operation prostatic obstructions are reamed off in strips with a wire-loop electrically charged with an endothermy or " cutting " current. Primary hæmorrhage is minimal. Secondary hæmorrhage is rare. A degree of local sepsis always follows the operation. For the last three years I have made a practice of giving a prophylactic intravenous injection of hexamine 30 grains (in the form of cylotropin), before the patient leaves the operating theatre. In this way sepsis is localized to the bladder, for constitutional symptoms of ascending infection or of septic absorption are seldom observed. Pyuria persists for weeks, perhaps months, after the operation, but is a silent, symptomless sepsis. The *Bacillus coli* is the infecting organism. Mandelic acid treatment is proving valuable in eradication of the residual sepsis, when a high acidity can be procured. Epididymitis, a complication sometimes met with in the earlier days of convalescence may be prevented by primary vas ligature.

In my own practice I have reserved this operation almost entirely for bad operative risks, the aged and feeble, most especially those in whom the myocardium could not be guaranteed not to play false. A large number were already leading a catheter life, and a fair proportion had been condemned to permanent suprapubic drainage, having been regarded as unfit for any radical treatment. Of the 225 cases treated transurethrally 120 (53·5 per cent.) had suffered either acute retention or chronic retention with overflow. In only 43 cases (19 per cent.) were there less than six ounces of residual urine. In 74 cases (32·9 per cent.) suprapubic drainage had been necessary. 51 cases (23 per cent.) of carcinomas have been treated by resection, in all of which either acute or subacute retention existed, for no other indication for the operation is recognized.

The advantages of the transurethral operation are that it enables the surgeon to remove just that part of the gland which obstructs with the most accurate precision, it is followed by no fall in blood pressure and therefore no shock, and it can be performed under what is perhaps the safest of all anæsthetics, the low spinal. The presence of a cystostomy opening is no hindrance, in fact it is an advantage in the performance of the operative technique. Such complications as were originally thought to be likely, hæmorrhage, sepsis, imperfect removal of obstruction, become fewer in proportion to the surgeon's experience. An objection often raised to this operation is the likelihood of recurrent obstruction. Actually it is found that if a sufficient amount of gland is resected initially, possibly two or even three sittings may originally have been required to effect this, the bladder exit thus procured remains open where non-malignant tissue was removed. Personal experience has proved that, excepting carcinoma, no case efficiently treated (in a series of 225 cases) has returned with recurrent obstruction. I treated my first case, one with acute retention, exactly eleven years ago, by electro-coagulation. This case had fourteen ounces of residual urine between his attacks of acute retention. To-day there is no residual urine, and there has been no dysuria since operation. Approximately 175 cases have been treated by resection, with satisfactory functional results, excluding cases of carcinoma, in which the benefit from operation seldom persists for longer than twelve months. The remainder, my earlier cases, were treated by electro-coagulation, or some form of punch.

In carcinomatous prostates the operation is no more and no less than a method of overcoming retention of urine preferable to cystotomy or a catheter life. Its only indication is retention of urine, and it is not done with the hope of retarding progress of disease. Hence in carcinomatous prostates the only indication for the operation is dysuria, by no means a constant symptom of the disease, as has already been stated. The immediate result of resection, when performed for acute retention due to prostate carcinoma, is dramatic. The operation is usually easy of performance, since the tissue to be removed is firm, fixed and circumscribed. Recurrence of obstruction is usually noted in from six to twelve months, and the incidence of spinal metastases is so high as to suggest that the type of operation may be of significance. X-ray treatment as an accompaniment has not appeared to have improved the prognosis in my series.

Various operative techniques for prostatectomy.—A description of the various modes of removing the gland, the advantages of the one- or the two-stage operation have occupied so much space in surgical literature in recent years that the subject of operative surgery will be excluded, except for mention of the Harris technique. This operation has gained a degree of popularity in Australia and the British Isles, for it embodies such steps as may eliminate the two bugbears of prostatic surgery, hæmorrhage and sepsis, and thus may permit of the surgeon's ideal, i.e. primary closure of the suprapubic wound of approach. The object has been gained by an ingenious method of obliterating the prostatic bed after removal of the gland, i.e. occlusion of the bladder sump, which must exist and be suitably drained in all other forms of prostatectomy.

Harris' operation is being submitted to exhaustive trials in this country and, so far, it appears to have stood the test, although modifications are frequently being submitted, with what justification is yet to be proved. Every " open " method of prostatectomy, that is prostatectomy under visualization, really owes its origin to the pioneer work of Thomson-Walker, for it was he who pointed out its necessities and described an operation which has been the basis for the Harris and many other modifications, so far seen and yet, no doubt, to be seen.

IMPORTANCE OF RENAL FUNCTION TESTS

Although the bed-side picture gives to the expert information enough to prescribe treatment, including operative assessment, yet every now and then a surprise is met. The greater the experience of the urological surgeon the better must he appreciate the possibility of pitfalls, hence, in his wisdom, he makes use of the laboratory to reinforce his clinical findings. The tests universally used in this country are the blood urea estimation and the urea concentration test of MacLean. Both are described in another article in this number (p. 887). Van Slyke's urea clearance test may, additionally, be employed, but it is questionable if the further information provided compensates the increased labour entailed. Excretion of dye tests have not gained wide popularity in this country: colorimetric tests cannot be precise when urine may be altered by a multitude of physiological and pathological factors, pigments, urates and blood.

INDIRECT OPERATIONS

By these are implied operations upon the vasa or testicles. That there is a close association between the development of the testicles and the prostate has long been known. John Hunter was aware that castration produced prostatic atrophy. Application of this phenomenon was introduced into surgery by Lannois in 1884, but it was not until twelve years later that castration was practised on a large scale, to procure shrinkage of an obstructing prostate. The results were bad and mortality was high, explained partly, no doubt, by the supposition that none but the most desperate cases would submit to so mutilating an operation. The failure of this operation led to the milder procedure of vas ligature, but no evidence has ever proved its benefits. Steinach's revival of this operation was not, apparently, with the object of relieving prostatism so much as to procure rejuvenation. The second operation conceived by this experimenter, and which is known as the Steinach II operation, consists in ligaturing the vasa efferentia, as they enter the head of the epididymis. Great claims are made for this operation, but Niehans, its greatest protagonist, admits that amongst his failures were cases of such glandular enlargement that only prostatectomy could reasonably be expected to give relief. Shrinkage of the gland is seldom observed as the outcome of the operation: what benefits are witnessed would appear to be physiological rather than anatomical, a reflex causing a muscular spasm of the sphincters may be broken by inclusion of sympathetic fibrils in the ligature. More than suggestion would appear to account for successes, as pointed out by Elliot-Smith, for many of his cases, elderly and enfeebled inmates of municipal hospitals hitherto dependent entirely upon the catheter, regained voluntary micturition. Niehans explains results on a hormone theory. The endocrine control of the prostate as he sees it, appears to depend upon a balance between three hormones: (1) prolan, the product of the anterior lobe of the pituitary gland, (2) a hormone from the Leydig cells of the testis, and (3) a hormone from the germinal epithelium of the testicular tubules. To the Leydig cell hormone is ascribed the function of directly controlling prostatic development, prolan would appear to share this function and both, if over-acting, tend to cause hypertrophy of the gland. The germ epithelium hormone is thought to exercise a restraining influence and has, for this reason, been called "inhibin." Prolan function may merely be to balance the testicular hormones, but earlier references suggest a more direct action (see above). Niehans believes that by application of the ligature escape and wastage of the germ epithelium hormone is prevented: it is, instead, deviated into the circulation and, thereby, its restraining influence, either directly upon the prostate, or by way of the pituitary hormone, is perpetuated.

That the changes in the prostate are coincident with change in the male state which has been called the male climacterium must at once lend colour to subservience of the gland to hormonal influence. As to a male climacterium, there appears sound reason for the belief that such a phase is presented, although in less circumscribed form than in the female, indeed in many males it may never appear. Relationship of climacterium to prostatic enlargement cannot be identified in aught else than age period; glandular development in no tangible data is related to sexuality, in spite of the popular allusions, it is more probable that endocrinal aberrations are to blame for either or both, and it is to be hoped that research, which is now being so energetically pursued will throw light on these problems in the near future.

OTHER DISEASES OF THE PROSTATE

An apology should be offered for having dwelt at length upon senile enlargement to the exclusion of other diseases. It may be surmised that the type discussed commands a greater interest. Space forbids inclusion of the inflammations of the gland, acute and chronic. Such references as have, so far, been made to carcinoma were mainly introduced for purposes of comparison in questions of diagnosis and operative interest. As to the treatment of carcinoma, it has been seen that transurethral resection offers relief for urinary retention. In my own series I have treated 51 cases of acute or subacute retention. Of these 17 had been subjected to suprapubic drainage and were subsequently resected; in the majority of the remainder catheter drainage only had preceded the electrical production of a free urinary outflow. When symptoms of obstruction reappear in from ten to twelve months after the operation, it has generally been found advisable to establish suprapubic drainage, for the constitutional state of the patient is such that he is not suitable for the additional risks and possibilities of failure of resection.

As to the more radical measures for attacking prostatic carcinoma, open operation is not merely to be mentioned to be condemned. If anything, it can be said that the operation is often flattering in its results.

I can recall two cases who, at the time, were diagnosed correctly (and proved histologically) as advanced carcinoma. In neither case did I feel that I had satisfactorily eradicated the growth, yet they lived five and seven years respectively. The first was re-admitted to King's College Hospital, on account of another malady from which he died. Autopsy showed no sign of carcinoma. The second died of a bleeding gastric ulcer, also in hospital, but in him there was definite recurrence of growth, although unaccompanied by local symptoms.

A considerable number of early cases are suitable for prostatectomy, particularly those in which carcinoma has developed in an adenomatous gland. Cases of recurrence after prostatectomy lend themselves well to electro-resection; I have examples alive and well two years after this treatment, and one lived three-and-a-half years and then died of general debility without urinary disability.

As to radiotherapy and radium treatment, the former I have used largely, but with disappointing results. Improvement may be observed at first, but this is short-lived. Two bad effects I have seen to follow: (1) the stimulus to metastases, (2) damage to the rectum, i.e. proctitis, with troublesome diarrhœa, and fibrosis. My experience of radium is very limited and I am therefore unqualified to express an opinion. It is significant that no convincing statistics have been published by those with ample radium at their disposal to encourage the less fortunate to pursue this form of treatment. Unless used with the utmost caution severe damage may be done, not the least distressing being sloughing of the rectal wall, with recto-vesical fistula formation. To see such a case, with perhaps urinary and fæcal fistulas in the perineum, should be a warning. The misery is indescribable. To procure longevity with carcinoma of the prostate, a permanent suprapubic drainage established when obstructive symptoms appear is the most reliable. I have known one case survive eight years under such conditions, and several others nearly as long. Limitation of experience of transurethral surgery necessarily prevents a wide enough scope upon which to base prognostic expectations; the impression, however, so far gained is that life is not appreciably lengthened by this operation, but is a happier one while it lasts.

Reference

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DISEASES OF THE MALE EXTERNAL GENITALIA

(other than venereal)

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IN this article, it is impossible to deal with rarities and it will therefore be confined to the commoner non-venereal lesions. The subject may conveniently be divided into the lesions of (1) the penis and scrotum, and (2) the testicles and their surrounding membranes.

THE PENIS

Congenital abnormalities.—Such rarities as congenital absence of or double penis need not be discussed. Other gross deformities of this organ are the result of failure in the normal development of the uro-genital sinus and genital tubercle, and are associated with varying degrees of hypospadias and epispadias. Here the faults in the development of the urethra outweigh in importance the penile deformity. Usually in such cases the penis is reduced in size and curved. It is of great importance in planning any plastic operation for the cure of hypospadias to pay attention to the preliminary straightening of the penis by carefully dividing the bands which pull it downwards.

The commonest minor congenital lesion is phimosis. This may be acquired in adult life from chronic or recurrent balanitis, but is far more often congenital in origin. In a lesser degree, it may cause frequent micturition and dysuria; and when more severe, bladder hypertrophy, hydronephrosis, hernia, and prolapse of the anus. Balanitis and paraphimosis are frequent complications. When the latter occurs immediate reduction should be carried out, if necessary under a general anæsthetic. Should the skin be markedly œdematous, help in reduction may sometimes by obtained by puncturing with a needle and an application of lint soaked in adrenaline and cocaine. If these measures fail, the constricting rings on the dorsum of the penis should be divided.

Trauma.—In addition to incised wounds, bites and accidental lacerations, fracture and dislocation must be considered. Fracture of the normal erect penis has been known to occur during coitus, but more often when this happens some predisposing cause such as peri-urethral induration around a stricture will be discovered. Dislocation of the penis from its surrounding integument and displacement into the subcutaneous tissues of the penis, scrotum, or groin is usually the result of a severe crushing accident.

Inflammatory lesions.—In addition to the balanitis and balano-posthitis secondary to phimosis, there exists a chronic irritation associated with diabetes mellitus or with a lack of personal hygiene. The latter condition demands prompt treatment in elderly men, because recurrent attacks of balanitis are likely to end in the appearance of a definite epithelioma.

Herpes prepucialis.—This is a somewhat mysterious lesion appearing most often in young or middle-aged men for no apparent reason, and then, after troubling them intermittently for two or three years, disappearing as mysteriously as it came. The attack begins by intense itching and burning of the foreskin and lasts five or six days, unless the vesicles become infected, when it is considerably prolonged. Circumcision is generally useless, vesicles forming elsewhere. Treatment consists in careful washing followed by the use of such a dusting powder as bismuth formic iodide. Although a minor lesion, it may cause great mental distress by suggesting to the patient that he has infected himself with venereal trouble.

Fibrous cavernositis.—In this, plaques of fibrous tissue form in the substance of the corpora cavernosa. They are hard and sometimes cartilaginous in consistence, appearing either secondarily to an indurative cavernositis or as a primary lesion of unknown origin. The patient complains of curvature of the penis during erection, the curvature being to the right or the left or towards the pubes according to the position of the induration. As a rule, primary indurative cavernositis, after extending slowly, becomes stationary. The distortion may, however, be sufficiently marked to render coitus impossible. The results of treatment are disappointing: excision is not successful in relieving the deformity and injections of fibrolysin, electrolysis and X-rays all have limited value.

New growths of the penis.—Papillomas are often venereal in origin but any chronic irritation or infection of the corona glandis or foreskin may lead to their appearance. Larger papillomas should be removed with curved scissors and their bases afterwards touched with silver nitrate. Smaller specimens readily yield to cauterization. Circumcision may be called for in order to prevent their recurrence.

Epithelioma is of comparatively frequent occurrence, forming about 3 per cent. of all malignant growths. Phimosis in an elderly patient is an important predisposing cause. The growth may start as a wart (87 per cent.), as a deeply situated nodule, or as an ulcer. Extension takes place along the lymphatics and into the corpora cavernosa. Two methods of treatment are available, amputation of the penis or radium therapy. Operative treatment may range in severity from partial amputation to complete emasculation, but in either case, the removal of the primary focus must be followed by complete extirpation of the lymphatic field. I prefer to deal with carcinoma of the penis by partial amputation followed by X-ray irradiation of the inguinal glands. The prognosis depends almost entirely on the stage of the disease at which treatment is undertaken.

Non-malignant new growths of the scrotum are uncommon, although sebaceous cysts are frequently met with. Epithelioma of that area has long been known as chimney-sweep's cancer. Apparently this disease is met with less frequently than was formerly the case. Operation consists in removing the affected area with a wide surrounding margin followed by a careful resection of the inguinal glands on both sides.

LESIONS OF THE TESTICLES

Congenital absence of one or both testicles is uncommon, the usual explanation of a missing testicle being that it has not descended or has atrophied at an early age. In ectopia testis the organ may lie in the perineum, Scarpa's triangle, in front of the pubes or on the abdominal wall above Poupart's ligament. In imperfect descent the gland may be retained within the abdomen, within the inguinal canal, or at the external abdominal ring. Usually the development of the testis is in direct ratio to the degree to which it has descended, the testis retained within the inguinal canal being more infantile in type than one which has reached the neck of the scrotum. Examined histologically it will show an increase in fibrous stroma, a diminution in the size and number of tubules, and an absence of spermatoblasts and spermatozoa. The complications that are likely to arise as a result of malposition, are attacks of inflammation, the appearance of a hernia owing to incomplete closure of the processus vaginalis, new growth, torsion of the cord and varicocele.

Treatment is undertaken in order to safeguard the gland from the trauma to which it is inevitably exposed and also to encourage its development by placing it in the only situation in which maturity can be reached. The experimental work of Evans and his associates has proved that a gonad-stimulating principle is present in the anterior pituitary. Recently this discovery has been utilized in the treatment of the imperfectly-descended testis. The preparation that is used is the water-soluble anterior pituitary-like hormone found in pregnancy urine (pregnyl, antuitrin-S and follutein). Intramuscular injections in doses of 500 rat units are given twice a week, the duration of the treatment varying from a few weeks to several months. A large number of successes are obtained, especially when the general development of the testis is definitely below normal. When the testis, although imperfectly descended, appears to be well developed it is possible that its failure to reach the scrotum is due to adhesions to other structures in the inguinal canal. In such cases, or when hormonic treatment has failed, orchidopexy is the operation of choice. Should operation show an insufficient length of the cord even after carefully freeing it from the peritoneum and dividing all fibrous bands, replacement within the abdomen is in my opinion, preferable to orchidectomy. Other surgeons, however, who are more impressed with the risks of an intra-abdominal testicle becoming malignant consider removal advisable. At one time it was believed that the late results of operation were bad, the majority of testicles either atrophying or becoming retracted towards the external ring. Careful investigation of late results at the Great Ormond Street Hospital for Children has recently shown, however, that with good technique permanently satisfactory results are obtainable.

Torsion of the testicle.—When this accident occurs some congenital abnormality of the cord or testicle usually exists previous to its torsion, and not infrequently the testicle itself lies loose and unduly mobile in the scrotum attached by a mesorchium. In many cases the complete torsion has been preceded by a history of previous attacks of pain or discomfort. These warning symptoms are caused by a partial torsion which has spontaneously righted itself. Although cases of strangulation when lying in bed have been recorded, the accident is more likely to occur as the result of muscular exertion such as cycling. The symptoms complained of are a sudden attack of severe pain in the testicle extending to the lower part of the abdomen. This is followed by collapse, vomiting and subsequent rise of temperature. A hard, tender, tense swelling is discovered in the upper part of the scrotum. The other conditions for which torsion is most likely to be mistaken are strangulated hernia and an acute epididymitis or orchitis. Immediate operation is essential, but in very few cases is this undertaken in time to save the testicle. Although bilateral torsion is a rarity, such cases have been recorded. It is therefore a wide precaution after dealing with the affected side to expose the opposite testicle and safeguard it from a similar accident by anchoring its lower pole firmly to the scrotum.

I have had the unfortunate experience of being called in at a late hour to deal with a twisted cord in a boy whose opposite testicle had been removed a few months previously for a similar accident.

Inflammatory lesions.—Inflammation of the testicle and epididymis may follow injury, but it is usually an episode in the spread of infection from the urethra or by way of the blood stream from a focus elsewhere in the body. When the path of infection is via the blood stream, it is the testis that is usually affected (orchitis); when the spread is along the cord, the epididymis (epididymitis).

Although epididymitis may be a complication of an infection anywhere in the urinary tract, it is especially likely to occur when there exists an inflammatory lesion in either the prostate or the vesicles, the organisms reaching it along the lymphatics in the outer coats of the vas deferens. Diagnosis does not present any difficulty, although it is not always easy to differentiate between an epididymitis and an orchitis, owing to the presence of fluid within the layers of the tunica vaginalis. Treatment consists in rest, attention to the primary condition of which the testicular lesion is a complication, and applications to the inflamed organ. The scrotum should be supported by means of a well-fitting suspender or by a sandbag or cushion placed between the patient's thighs. During the first twenty-four hours a small bag of finely crushed ice applied to the testicle gives great relief. Later, applications of heat or of guaiacol ointment (10 per cent.), antiphlogistine, or 10 per cent. silver nitrate may prove useful. Pain and tenderness diminish at the end of two or three days, but in some cases, depending on the infecting organism and on the resistance of the patient, the condition goes on to suppuration.

The operative measures that may be undertaken in connection with epididymo-orchitis are (*a*) puncture with a large hypodermic needle or a small tenotome in very acute cases for relief of pain, (*b*) exposure of the testicle and incision where suppuration has followed, (*c*) orchidectomy, when on exposing the testicle, it is found to be so badly infected as to be virtually a useless organ, (*d*) vaso-ligature undertaken in cases of recurrent attacks of epididymitis in order to block the path along which the invading organisms travel.

Tubercle of the testicle.—This may clinically so closely resemble other infections as to make a differential diagnosis difficult. It is not surprising therefore that many cases of chronic epididymitis are wrongly labelled tuberculous. This similarity supports the view that the tubercle bacillus travels along the same path as other organisms, namely the lymphatics of the vas. It is also an argument against the wholesale sacrifice of tuberculous testicles advocated by some surgeons. Should operation be necessary, epididymectomy and not orchidectomy, is the ideal procedure, since in some seventy per cent. of cases the opposite side will become affected within two or three years. When carrying out this measure it is my own practice to ligature the opposite vas in order to afford some protection to the hitherto healthy epididymis. The focus in the prostate or vesicles should be treated by attention to general hygiene, and if possible, sanatorium treatment. The necessity of excluding the existence of a renal focus cannot be too strongly emphasized.

New growths.—The complicated pathology of new growths of the testicle can be most satisfactorily considered by dividing the growth into two main groups; the *seminomas* arising from the differentiated germinal epithelium, and the *embryomas* or *teratomas* arising from undifferentiated germ cells. As the spread to the lymphatic glands is very early, and all growths of the testicle remarkably malignant, prompt and effective measures must be undertaken if the patient's life is to be saved. In passing, it should be pointed out that although neoplasms usually affect the testis, new growths of the epididymis are commoner than most medical men realize. Should the true nature of a testicular swelling ever be in doubt, immediate exploration is always advisable. Another point that cannot be too strongly emphasized, is the fact that mere removal of the organ without the adoption of measures directed against spread along the lymphatics is never justifiable. In dealing with the lymphatics, two methods are available: complete extirpation with the knife and deep X-ray therapy. My own opinion is that since most testicular growths are radio-sensitive, deep X-ray therapy is the treatment of choice. After orchidectomy supplemented by X-ray therapy, the patient may live five, ten, fifteen, twenty or more years without any recurrence.

LESIONS OF THE SURROUNDING MEMBRANES

Hydrocele, hæmatocele and spermatocele.—These conditions are so well known to the practitioner that it is unnecessary to deal with them at any length. It may, however, be pointed out that the development of cystic swellings in the epididymis is a common incident in the involution of the genital tract. Some so-called hydroceles in elderly men are not truly hydroceles but have their origin in the epididymis. No special treatment is required unless the swelling is of such a size as to incommodate the patient. If this be the case, excision should be carried out. Of recent years a revival of the old method of tapping followed by injection has occurred, a 5 per cent. solution of sodium morrhuate being substituted for the older carbolic acid. In my hands this resurrected treatment has occasioned as much discomfort as a radical operation: it also has the disadvantage of being considerably less reliable.

Varicocele may be considered under the heading of lesions of the covering of the testicle. It is the experience of most surgeons that very few cases of varicocele require operation. More frequently than not when a patient complains bitterly of a varicocele his discomfort is but a symptom of a sexual neurosis. A ligature operation in such a case will do more harm than good by tending to fix the patient's attention on his genital organs. E. Corner long ago called attention to the damage done to testicular tissue by an ill-judged operation on a varicocele. It is fortunate that the profession now realizes that surgical interference is but rarely called for.

The commonest cause of hæmatocele is severe trauma or it may be the result of puncture of the testicle while tapping a hydrocele. If it occurs spontaneously the possibility of a new growth of the testicle must be considered. In old standing cases incision, or should the testicle be fibrous or atrophied, orchidectomy is necessary.

SURGERY OF THE URINARY TRACT IN CHILDHOOD

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THE urinary tract is the field of what is now a well-established branch of children's surgery. Thanks to the instrument maker's skill in providing instruments of a sufficiently small calibre, the precise investigational methods employed in the adult have, in recent years, become available for the child. The result has been to enable the surgeon to elucidate many obscure ailments of the urinary tract in childhood, and to assist materially in their alleviation. There is still important work to be done in this surgical by-path, but already much has been done by the pioneers of the past decade, notably Addison and Duncan Morrison in this country, and Meredith Campbell in America.

CLINICAL MANIFESTATIONS

The clinical manifestations in these cases may be classified as follows:—1. General, e.g. pain, fever, presence of a tumour. 2. Disorder of micturition, e.g. frequency, urgency, pain, and dribbling. 3. Changes in the urine, e.g. smell, cloudiness, presence of blood and pus.

Pain.—This symptom is often vague and misleading. The child, if old and astute enough, may refer the pain to one or other loin or to the genitals, but more often the story is of a vague stomach-ache, and the intestinal tract may, naturally, be blamed. A distended and tender bladder or a hypersensitive loin may give the clue to a urinary tract lesion, and examination of the urine may afford confirmation thereof. The difficult cases, however, are those in which the history is one of unlocalized pain, possibly severe enough to cause pallor and nausea, but without detectable physical signs. The possibility of an intermittent hydronephrosis or other urinary tract lesion, should always be in mind, and no operation should be embarked upon without adequate preliminary urological investigation.

Fever.—In any case of unexplained fever in a child, it is a cardinal rule to examine the urine. An unsuspected urinary tract infection is often found. Recurrent attacks of acute pyelitis are characterized by intermittent bouts of high fever, associated with pain and tenderness in the loin, followed by discharge of pus and even muco-purulent casts in the urine.

Tumour.—In normal circumstances, the lower pole of the right kidney can just be felt and that of the left occasionally, on bimanual palpation. Minor degrees of enlargement may be noted and correlated with other clinical evidence. A tumour of size sufficient to enlarge the abdomen appreciably may be due to a renal growth, a hydronephrotic, pyonephrotic or congenital cystic kidney. Palpation will usually determine that the lump has its origin in the loin and give an impression of its consistency. An intermittent loin tumour strongly suggests a hydronephrosis, especially if pain, associated with its presence, is relieved by its disappearance.

Disordered micturition.—Careful inquiry must be made of the mother or nurse as to the symptoms, frequency, urgency, painful micturition, dribbling (soiling of clothes or bed) feeble or intermittent flow. It is always instructive to watch the child pass urine. Frequent, urgent, and painful voiding of the urine indicates undue irritability of the bladder, the result of infection and inflammation. Dribbling, feeble or intermittent flow, suggests a urethral obstruction, or nervous disorder.

Changes in the urine.—Essential information is of course obtained from examination of the urine, and much may be learnt without invoking the aid of the laboratory. The routine procedure should be as follows :—

Specimens (morning and evening) are collected and set out in a clean urine glass, protected by a muslin cover. If considered necessary, the total quantity of urine passed in the twenty-four hours is measured and recorded. Specimens may be difficult to collect, e.g. if napkins are worn. In small boys a test-tube is strapped to the penis and, if need be, the infant is restrained in a simple frame. In little girls, resource must be had to a catheter. Specimens are examined physically, chemically and microscopically. The colour, clarity, and smell, specific gravity and reaction are noted and any deposit observed. The urine is then tested for the presence of any abnormal constituent, such as albumin, blood or acetone, and finally the deposit, if present, is examined under the microscope for pus, blood cells, or crystals.

If the investigation thus far justifies it, a specimen may then be sent to the laboratory for more complete examination. This should be a " catheter " or " clean " sample. A sterile flask is obtained from the laboratory (a boiled test-tube, plugged with sterilized cotton wool will serve as a substitute). Every possible precaution is taken to avoid contamination. To take a " catheter " specimen, the child's genitals are carefully cleansed with swabs wrung out of a suitable antiseptic solution, e.g. perchloride of mercury 1 in 10,000. The hands are washed carefully and dipped in the same lotion. A soft boiled rubber catheter is then passed and the urine collected directly into the sterile receptacle. This is then securely plugged with sterile cotton wool and labelled clearly. To collect a " clean " specimen (which is less reliable) the genitals are cleansed as before and the child instructed to pass urine. The first ounce or so is discarded and the remainder is passed directly into the sterile receptacle. The laboratory can undertake not only a more detailed examination of the urine, but also can supply an account of the numbers and types of organisms present in the urine. When required, the pathologist can also estimate the renal function by appropriate tests—blood urea or urea concentration.

RADIOLOGICAL INVESTIGATION

X-ray examination by means of (1) plain skiagrams, (2) excretion pyelography, and (3) retrograde cystography and pyelography, supplies valuable information. Preliminary preparation is necessary to get rid of intestinal gas. Aperients assist but little and it will generally be found better to keep the child for a day or two on a low, easily digested diet with a minimum of sweet, starchy foods and little to drink, giving an enema, if necessary, before the picture is taken.

Excretion pyelography affords a useful estimate of renal function and demonstrates abnormalities of structure and position of the kidneys and ureters.

Unfortunately the method is not applicable to young infants. In them the dye is excreted so rapidly that the degree of concentration required to give a shadow is never obtained. After the age of two years uroselectan B (4–12 c.cm. or more) is injected intravenously. Brief gas and oxygen anæsthesia may be desirable in a nervous child. Exposures are made at intervals of five, ten, twenty or more minutes, when the pelves and ureters should be outlined. It is always well to take a preliminary picture to see that the intestines are reasonably empty. The clarity of the radiograms will be greatly enhanced by careful preliminary preparations, withholding *all* fluids by mouth for the previous twelve hours, so as to ensure a concentrated urine. An oral method of administering the dye would be of great value in childhood, but, as yet, no really satisfactory technique has been evolved.

A retrograde cystogram is obtained by introducing a catheter and distending the bladder with 13·5 per cent. sodium iodide solution. This method is utilized to demonstrate diverticula and the condition of the bladder neck and posterior urethra. In children in whom there is a gross dilatation of the ureter, with patent vesical orifice, if the child is tilted, the fluid may be induced to enter and distend the ureter and a satisfactory pyelogram is thus obtained (Fig 1).

Retrograde pyelograms are obtained in the usual way by cystoscopy and ureteral catheterization. The catheters are introduced on the operating table and the child is then taken to the X-ray room where sodium iodide solution (1 c.cm. for every year of age up to 6 c.cm.) is injected and the exposure made. The film is developed at once. If necessary more fluid can be injected and a further picture taken.

CYSTOSCOPY

With the instruments now available it is possible to carry out cystoscopy, and even ureteral catheterization, in children from the age of approximately eighteen months. In the very young it will be necessary to use a single catheterizing instrument, and to catheterize each ureter at a separate sitting; but in the majority of children of both sexes in whom such investigations are called for, a double catheterizing instrument can be passed. The restrictions are naturally greater in boys.

A general anæsthetic should almost always be given. It can occasionally be dispensed with in older children of suitable temperament. The bladder may be washed out by the syringe method, or an irrigating cystoscope employed which has advantages in many cases. The utmost gentleness should be exercised, but the general technique differs in no way from that employed in the adult. The bladder capacity is noted, and the usual inspection of the interior systematically made. The appearance and activity of the ureteric orifices and the nature of the efflux are observed. It is advisable to note any localizing landmarks, as the subsequent passage of the ureteric catheters is thereby facilitated. A few c.cm. of indigo-carmine may be injected intravenously and its excretion watched for. When necessary, ureteric catheters are introduced. This procedure while usually simple may, on occasion, present con-

FIG 1 —Cystogram from a boy, aged 7 years, suffering from chronic pyuria and retention of urine After the bladder had been moderately distended with sodium iodide solution, the child was tilted, when the right ureter and renal pelvis filled, as shown in the photograph The left ureter was also dilated, though not demonstrable by this method The condition resulted from achalasia of the bladder neck and was improved by presacral neurectomy

siderable or even insuperable difficulties, on account of œdema of the mucosa, constriction or other deformity of the orifice. When the catheters have been passed, an attempt is made to collect samples of urine from either kidney. In the child this is often unsuccessful owing to the necessarily minute guage of the catheter.

PYURIA

Pyuria becomes a surgical problem (1) when it persists in spite of treatment for a period longer than six to eight weeks; or (2) when it is recurrent in type. Such patients often exhibit acute exacerbations with loin pains, tenderness and fever. In the intervals the urine is sterile. Every child suffering from such a persistent infection of the urinary tract ought to be submitted to a comprehensive urological investigation. In many cases a developmental anomaly will be disclosed, and in a fair proportion of these, operative interference is necessary for cure: in the remainder, treatment can at least proceed upon rational lines.

DEVELOPMENTAL ANOMALIES

These may be many and various. In the main their effect is to determine obstruction at some point or points in the urinary channel with resulting dilatation and stagnation of the normal flow of urine. Such stagnation predisposes to infection, and once infection has occurred, inflammatory swelling further aggravates the obstruction. A vicious circle is formed and recovery retarded.

Urethra.—A tight phimosis is said to be capable of causing obstruction to the outflow of urine. This is extremely doubtful, but pinhole contraction of the external urinary meatus can certainly do so. In such a case, the bladder may be found distended, causing the child vague abdominal discomfort and dribbling. Meatotomy will effect a speedy cure.

Urethral valve.—Instances of this rare anomaly have been reported by Young, Addison, Meredith

Campbell and others. The site of the obstruction is the prostatic urethra and the condition is almost confined to boys. The clinical picture is striking, the bladder cannot be emptied and there is progressive retrograde dilatation of the bladder, ureters and renal pelves. Renal function deteriorates, and uræmia eventually supervenes. Many of the cases have only been discovered at post-mortem examination. During life, the condition is suggested by a distended bladder and dribbling and the sallow complexion. Micturition is a straining jerky prolonged attempt to circumvent the obstruction. A catheter passes easily since the valve is open from below upwards, closing only when urine flows from the bladder, and the residual urine will be large in amount. A cystogram shows a " pear-shaped " shadow the stalk representing the dilated prostatic urethra proximal to the valve. In favourable cases, the bladder is opened and the valve dealt

FIGS. 2 and 3 are from a boy, aged 2 yr. 4 mth, who had suffered from recurrent attacks of "pyelitis" and chronic pyuria for six months. On ureteral catheterization pus flowed from the right catheter. The pyelogram shows a double pelvis on the right side with dilatation of the lower segment

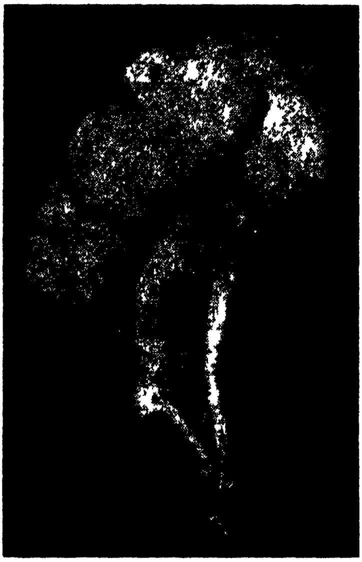

FIG. 3—The specimen removed at operation. This boy's urine was sterile one week later

with from above. *Achalasia of the bladder neck* simulates the above but there is no urethral dilatation. The obstruction is due to a neuro-muscular inco-ordination, causing spasm, analogous to congenital pyloric stenosis or Hirschsprung's disease, of which it is a not infrequent concomitant. In the treatment sympathectomy has to be considered.

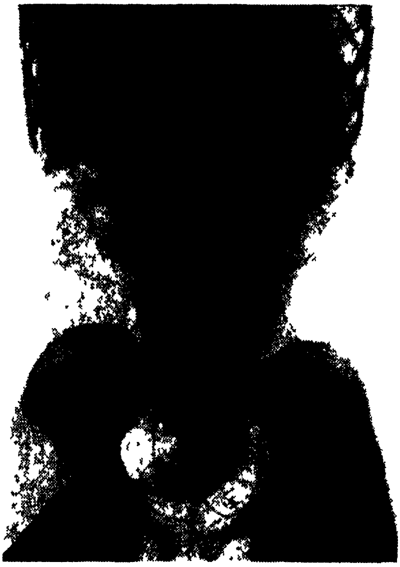

Fig. 4.—Pyelogram from a girl, aged 5 years, suffering from chronic pyuria and recent hæmaturia. The child was found to have bilateral reduplication of the renal pelvis and ureter. A minute calculus was also demonstrated in the lower calyx of the left kidney, accounting for the hæmaturia. This girl had been in prolonged decubitus, undergoing treatment for double congenital dislocation of the hip.

Fig. 5.—Pyelogram from a boy, aged 5½ years, suffering from intermittent abdominal pains and pyuria. A single kidney with gross distortion of the ureters is revealed.

Diverticula of the bladder are rare in childhood, but they do occur and may then be the cause of chronic pyuria.

Developmental anomalies of the ureter and renal pelvis comprise by far the largest group of these cases. The following may be found singly, or in any combination, and on one or both sides.

Ureter	Stricture of vesical orifice. Dilatation of ureter (mega-ureter). Reduplication of varying degree, with or without double vesical opening.
Renal Pelvis	Dilatation (hydronephrosis). Double pelvis with or without corresponding reduplication of ureter

Finally there may be suppression of one kidney or various types of fusion into a single kidney. It is clear that the existence of any of these structural abnormalities may mean the persistence of an infective focus, effectively retarding the cure of the pyuria, unless it be removed or drained by operative treatment.

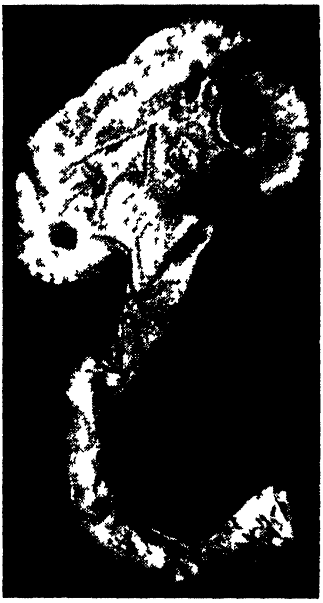

Fig 6 —The left kidney and ureter removed by Mr Addison from a boy, aged 1½ years, who had suffered from pyuria since early infancy The urine was sterile fourteen days after operation

NON-OPERATIVE TREATMENT OF CHRONIC PYURIA

Brief reference must be made to the more important medicinal and dietetic measures employed. Urinary antiseptics are legion, in practice the majority may be disregarded. Hexamine is valuable, 5 grains may be given four to five times daily or even more according to age. It must be combined with a urinary acidulant, acid sodium phosphate 10–15 grains, or ammon. chloride 2–3 grains. The urine should be tested to ensure a requisite degree of acidity and for formalin. After four to five days an interval is allowed. Salol or hexylresorcinol may be substituted for hexamine.

"*Ketogenic diet.*"—The child is given an excess of fats and a minimum of carbohydrates to induce a ketosis, shown by acetonuria. The acids then being excreted in the urine act as sterilizing agents. The urine should become sterile in a very few days.

Mandelic acid.—The use of this substance has emerged from the preceding. Mandelic acid is sufficiently stable to be excreted unchanged in the urine after oral administration, and will exercise its antiseptic properties provided the urine is kept sufficiently acid. It is now best given in the form of ammonium mandelate. The urine must be tested daily to ensure the requisite acidity and concentration of mandelic acid. The pH must be at least 5·5 and the concentration of mandelic acid at least 4 per cent. If necessary, the dose of the drug is increased and ammonium phosphate is added as an acidulant. It must be borne in mind that the drug is an irritant and capable of damaging the renal epithelium. It should be given with caution, especially in children with impoverished renal function.

HÆMATURIA

Apart from systemic disease, e.g. hæmophilia, nephritis, injury, or the transient smokiness which may mark the acute onset of urinary tract infections, hæmaturia in childhood may be the prominent symptom in meatal ulcer, calculus, tuberculosis. On rare occasions it may result from ulceration of the bladder, nævous growths, essential hæmaturia, congenital cystic kidneys, and hydronephrosis.

Meatal ulcer is, in my experience, easily the commonest cause of hæmaturia. The child is brought with the story that micturition is painful and a small quantity of bright blood is noticed at the beginning and the end of the act. The child has almost invariably been circumcised and, on examination, the external urinary meatus is either glued up by a scab of blood or exhibits a raw crack on its lips. There may also be other evidence of ammoniacal dermatitis—raw areas or blisters on the penis and scrotum.

The treatment is simple and in most cases rapidly effective. The ulcer arises from ammoniacal fermentation of the urine and the antidote is boracic acid. If the child is still wearing napkins, it should be seen to that these are always thoroughly washed, wrung out, and dried and then soaked in a concentrated solution of boracic acid, so that when dried they are impregnated with boracic powder. Napkins should always be changed at once when wet with urine. In older boys during the day-time, a protecting pad of lint smeared with boracic ointment should be adjusted with tapes and the trousers worn loose. At night a loose shirt is worn and a boric napkin arranged to collect urine if it be passed involuntarily. Boracic ointment may also be applied to the ulcer with a glass rod. In obstinate cases with a small meatus, meatotomy may be necessary.

Calculus.—Calculus formation in the urinary tract is not unduly rare in childhood. In the main the features presented differ but little from those exhibited in the adult. Stagnation of urine and infection are the most important factors predisposing to stone formation. Stagnation may be due to some purely local cause, such as hydronephrosis or to prolonged recumbency in splints, as is well recognized in orthopædic institutions. It were well to bear in mind that removal of the calculus alone is not enough. The underlying cause, e.g. hydronephrosis must be removed if possible to prevent recurrence. An interesting group of calculi, disproportionately frequent in childhood, are those met with in association with aberrations of metabolism (cystinuria), dietetic deficiencies (insufficient fat, soluble vitamin). Stones in the kidney are usually discovered by the passage of blood or pus in the urine. Passage of the stone down the ureter produces renal colic, which in younger children may not be easily recognized. The severe belly-ache, vomiting, and possibly convulsions, may be misleading. Retraction of the testicle, if present, is a useful sign. Small stones may become impacted in the ureter, and then demand all the surgeon's skill and judgment to deal faithfully with them. They may also be passed per urethram or become impacted in the urethra. In the bladder, a stone may grow to considerable size. It produces the usual symptoms of frequency and dysuria. Removal is easy by suprapubic cystotomy, and in children it is usually safe to close the bladder forthwith, draining only the prevesical space.

Tuberculosis.[1]—Renal tuberculosis in childhood results from a blood stream infection arising in some distant focus. It is probably not infrequent in association with bone and joint tuberculosis. Apart from generalized miliary infections, it is certain that minute foci in the kidney may cause the passage in the urine of tubercle bacilli, pus, (possibly only microscopic) and blood for a time, and yet end in complete recovery. It is only when the disease in the kidney is progressive that operative interference may be called for. Such advance is slow, possibly several years in duration, and may be arrested at any stage. It is indicated by occasional bursts of hæmaturia; and symptomless hæmaturia is perhaps the most important clinical sign. Usually there is also chronic or remittent pyuria with slight fever and a gradual deterioration in general health. Secondary *B. coli* infection is a late development, so that the pyuria usually proves sterile to ordinary cultural methods, and guinea-pig inoculations are necessary to prove its true nature. In the later stages, the ureter becomes infiltrated and thickened and the bladder involved. Cystoscopy may reveal changes in the vicinity of the ureteric orifice; in the early stages an angry blush with possibly isolated tubercles visible upon it: later deformity of the ureteric orifice, and possibly infiltration and ulceration of the bladder wall. Treatment in the early stages, is on the usual anti-tuberculous lines, preferably in a sanatorium. In the later stages, surgical intervention may be needed. Provided the child's general health indicates that the disease in the urinary tract is the dominant lesion, and provided that one kidney is chiefly involved, nephro-ureterectomy gives excellent results.

HYDRONEPHROSIS

Dilatation of the renal pelvis may be of any degree and type, may affect one or both kidneys, and be combined with ureteric or renal abnormalities. It therefore follows that the clinical features may be correspondingly varied. A hydronephrosis may be suggested by a painless cystic tumour in the flank or by recurring attacks of pain, nausea and vomiting, possibly associated with a similar tumour which is intermittent in character. On the other hand, the condition may only be revealed by pyelograms taken to elucidate chronic pyuria, hæmaturia or even " abdominal pain." In the majority of cases, the dilatation has clearly resulted from a mechanical obstruction, e.g. a valve, constricted pelvi-ureteric junction, abnormal branch of the renal artery, or congenital adhesions. Sometimes inflammatory reaction or a stone may appear to be causal factor. In this obstructive type, the treatment is necessarily operative, and the question whether or not the kidney can be saved depends on the nature of the obstruction, and the degree to which the kidney has already been damaged. In favourable cases, division of an abnormal artery and/or freeing of the ureter from adhesions have given gratifying results. Plastic operations on the pelvis and ureter are less successful. Great difficulties are presented by the small size of the child's ureter. Nevertheless they may be attempted on occasion.

NEW GROWTHS

Nævi have been recorded in the kidney and bladder giving rise to hæmaturia, but they are exceedingly rare. I once assisted Mr. O. L. Addison in the treatment of a large nævus of the bladder. The bladder was opened and the nævus cauterized with complete success. There are, however, important and distinctive new growths met with in the child's kidney. The commonest is the Wilm's tumour, characterized by a symptomless onset, absence of hæmaturia, and a high degree of malignancy. The tumour is composed of rudimentary renal cell elements and is very hæmorrhagic, grows rapidly, invading and destroying the normal renal tissues. It disseminates easily via the blood stream, giving rise to metastases in the lungs. Children of any age may be affected, but especially those between two and five years. Hæmaturia is rare, and the first sign noted is usually a painless enlargement of the abdomen. On examination there will probably be found a surprisingly large solid tumour, clearly springing from the loin. Pyelograms are usually characteristic, the pelvis and upper ureter on the affected side, being thrust out of position by the growth. A skiagram of the chest should always be taken to exclude metastatic deposits. If this is negative, and the remaining kidney is functioning well, the growth should be removed as widely as possible. Unfortunately recurrence, both locally and by venous metastases, is to be expected in the majority of cases within 12 months. Recent advances in X-ray therapy, however, bid fair to alter the outlook for these cases. By suitable treatment before and after operation, the risk of dissemination appears to be greatly diminished. The application of the rays is a highly skilled procedure but has already given most promising results. Other growths occasionally met with include fibrocystic tumour with intracystic papilliferous proliferation. Clinically, this tumour may be indistinguishable from the " Wilm's " tumour, but the child is usually older and most often a girl, and the tumour may feel cystic. Degenerate soft areas may, however, also occur in a Wilm's tumour. This type of growth fortunately appears virtually non-malignant and removal is curative. Fibrosarcoma, carcinoma, and teratoma have been found on occasion and their removal has been successful.

Reference

[1] Addison, O. L.: *Brit. Med. Journ.*, 1935, ii, 565.

THE ESTIMATION OF RENAL FUNCTION

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THE problem of the estimation of renal capacity or function is by no means simple. The kidney is a complicated structure the main function of which is the excretion of waste products; but disturbance or damage of the kidney may lead to effects other than mere retardation of excretion rates, for apart from the addition to the excreted bodies of substances such as albumin, red blood cells or casts, such a disturbance may lead to profound vascular effects, organic as regards vascular histology, functional as regards increased blood-pressure. This latter is a point of some complexity as these particular changes can also occur without any primary renal disturbance as in essential hypertension. Renal function may also be disturbed from without, prolonged hypertension may finally damage the kidney, and congestive heart disease or metabolic changes such as alkalosis may greatly impair renal capacity. It is therefore not surprising that it is difficult to find renal function tests that can be applied to all conditions in which the kidney is involved, and in practice it is still impossible to interpret available tests without the fullest consideration of all the clinical, metabolic, and pathological information that can be collected as regards a single case.

In considering all biological functions it is wise to adopt a cautious attitude towards all attempts to estimate such functions in numerical terms. Human individuals obviously differ so much, not only as regards their shape and size, but also as regards their rates of function and, as a result, average values are not necessarily measures of normality or points from which departure from normality can be estimated.

For example, in an individual aged 25, with a systolic blood-pressure of 145 mm. Hg, the odds may be 20 to 1 against this value being "normal" (i.e. consistent with perfect health), yet he may live a long life without cardiovascular disease. In other words, his blood pressure was "normal" and differed from the average in exactly the same way as Cyrano's nose.

The estimation of renal function is desired generally for two associated purposes, namely, the establishment of prognosis and as a guide to treatment. In Bright's disease such information can be extremely valuable, but other uses are to be found in the estimation of operative risks when the kidney is damaged as in enlargement of the prostate, or when it is necessary to determine if certain symptoms or signs truly denote the presence of renal disease. It will be necessary to consider these different groups separately.

I have expressed elsewhere my views that in Bright's disease most existing classifications are misleading because of the presence of a continuous grading of cases between the arbitrarily defined groups, and I prefer a simpler division into two groups only, which include the majority of cases: (*a*) Toxic nephritis (including acute, subacute and chronic forms). (*b*) Ischæmic nephritis (also known as primary contracted kidney, nephrosclerosis, chronic interstitial nephritis).

Toxic nephritis includes all forms of nephritis in which, presumably following the action on the kidneys of poisons such as bacterial toxins, noxious chemicals or metabolic disturbances, the syndrome comprises albuminuria, hæmaturia, nitrogen retention, hypertension, vascular change and œdema in varying degree and at different times or at the same time. In the acute forms, such as in scarlatinal nephritis, hæmaturia, slight albuminuria, slight œdema and oliguria form a syndrome on which hypertension and excretory failure may rapidly be superimposed, but though the course of the disease may be stormy it is generally rapid, and with an excellent prognosis. More chronic forms show a sequence in the occurrence of these features inasmuch as there is an initial period marked by gross albuminuria, little or no hæmaturia, and definite œdema or anasarca, and after a variable period, hypertension and ultimately nitrogen retention appear, œdema tends to vanish and the final phase is essentially uræmic. These phases may be distinct but may overlap considerably. The prognosis is serious but recovery may occur.

In the most chronic cases the progress is so slow that, for years, only the first phase of albuminuria and œdema is evident, and some authorities speak of these cases as nephrosis. Such cases occasionally recover or may eventually progress as the less chronic ones and terminate in uræmia.

The progress of the subacute and chronic forms is not necessarily uniform. Changes in tempo, in the form of exacerbations or remissions, are frequent, presumably dependant on the fundamental but unknown cause. In all the cases marked by heavy albuminuria and œdema prognosis is difficult as intercurrent infections, such as pneumococcal peritonitis, often terminate the illness.

In the group of ischæmic nephritis the symptoms are mainly vascular in origin, hypertension is finally followed by cardiac hypertrophy and late involvement of the kidney, the latter being evidenced by polyuria, nocturia and slight albuminuria, and the cases terminate with some cardiovascular failure as cerebral hæmorrhage or coronary thrombosis.

This brief summary of Bright's disease is of assistance in defining the abnormalities which can be observed or even roughly evaluated to provide an estimate of renal capacity. The most important of these departures from the normal are:

(1) Presence of foreign bodies in the urine, albumin, globulin, casts, red blood cells.

(2) Retention of normal excretory products such as urea and other nitrogenous substances, salt and water.

(3) Occurrence of vascular changes, hypertension, cardiac hypertrophy, retinitis.

(4) Œdema.

ALBUMINURIA

In clinical work there is little to be gained by accurate estimation of the urinary protein or of the amount of globulin accompanying the serum albumin which forms the bulk of the urinary protein. It is not sufficiently recognized that the simplest test for albuminuria is to add four or five drops of a saturated solution of salicyl-sulphonic acid to 5 c.cm. of urine in a test tube when protein is immediately precipitated and does not disappear on warming. Albuminuria is generally evidence of damage to renal function but is in no way proportional to the degree of it. Slight albuminuria may occur in acute toxic nephritis when there is almost complete loss of excretory power, or gross albuminuria may be present in chronic forms when renal function is otherwise satisfactory. The loss of albumin in the urine may be so considerable that more than 10 per cent. of the serum albumin may be lost per day and it is the consequent change in serum composition which is the main cause of the œdema or anasarca. The amount of such œdema is therefore not indicative of the degree of renal damage.

The early stages of nephritis are easily missed and patients are sometimes seen for the first time in the terminal stages of chronic toxic nephritis. In the early stages of these cases œdema does not occur or is not noticeable and consequently the patient has no obvious symptom for which to seek advice with the possible result that the progress of the case is determined by the lack of treatment. In scarlet fever, patients are still under observation when nephritis is likely to appear; but cases of streptococcal tonsillitis are not watched in the same way, whereas it is equally important that their urine should be tested up to three or four weeks from the onset of the attack.

Albuminuria, however, also occurs in physiological conditions, such as after exercise or a cold bath when its appearance is, of course, transitory, in congestive heart failure, and in orthostatic albuminuria. Bence-Jones proteinuria need not be considered here except to mention its easy recognition by the low temperature at which the protein coagulates in a heating test, and its tendency to re-solution on further heating.

In congestive heart failure the degree of renal damage can be measured by other means, but the albuminuria is a useful pointer by which to mark the success or otherwise of the treatment of the cardiac condition.

Orthostatic albuminuria is an important condition of not infrequent occurrence and albuminuria from this cause may lead to unnecessary rejection of life insurance proposals or to an erroneous diagnosis of nephritis. It generally occurs in young thin individuals with a definite degree of lordosis. The appearance of albuminuria in orthostatic conditions, the absence of urinary casts and of other signs and symptoms of nephritis are indicative of this condition, a confirmatory test for which will be described later.

RED BLOOD CELLS AND CASTS

The occurrence of red blood cells in the urine in nephritis is an indication of the severity of the renal involvement; in acute toxic nephritis they are abundant, in the more chronic forms they are few in number or absent, in exacerbations in chronic forms with more rapid downhill progress erythrocytes reappear or increase in number. Casts in small numbers and of the hyaline variety can be found in normal urine. They are not always easily detected as they may break up and dissolve in urine which stands, particularly if dilute or alkaline. Hyaline casts in association with slight albuminuria appear characteristically in ischæmic forms of nephritis, casts of more granular type with epithelial and blood casts appear in toxic nephritis. It can be said that in any case of albuminuria the persistent presence of casts in the urine is pathognomonic of renal damage.

RETENTION OF EXCRETORY PRODUCTS

Disturbance of renal excretory activity in the direction of retarded excretion of substances constituting normal urine, with consequent retention of such substances, provides the most helpful conditions for evaluation. The retarded excretion of water and salt are shown obviously by the presence of œdema, but further study reveals this phenomenon to be one of great complexity, not only because of the complication of œdema being due to other causes such as cardiac failure, but because the excretion of salt and water depends not only on the kidney but also on the condition of the tissues.

Certain simple tests of renal excretory power based on observation of urinary concentration have some rough value. The specific gravity is an easily ascertained measure of this concentration. It should rightly be determined in urine which has been freed from protein, but, as the greatest changes in the specific gravity generally occur either in the late stages of toxic nephritis, or in ischæmic nephritis, in which the albuminuria is usually slight, direct determinations on the untreated urine are sufficiently accurate. It can be stated that a specific gravity of 1·020 or higher in any specimen of urine is evidence of adequate renal function provided there is no œdema of nephritic or cardiac origin and in the absence of acute nephritis or alkalosis. In acute nephritis the specific gravity may be raised much above normal. A particularly useful field for this simple test is in the detection of gross loss of renal function in ischæmic nephritis. A specific gravity of under 1·010 in a urine containing only a trace of albumin or no albumin makes further investigation essential. An operation, for example, carried out in such a case might precipitate uræmia.

Volhard and others introduced tests using periods of fluid deprivation and periods of excess fluid intake. These tests take time and also, owing to the limits of variability found in the behaviour of normal subjects, such tests are not always easy to interpret. Two of the simpler tests are not, however, without value. In Addis and Shevky's test the patient abstains from fluid for twenty-four hours and during the last twelve hours of this dry period, conveniently 8 p.m. to 8 a.m., the urine is collected and the specific gravity is measured. In normal subjects on ordinary diets the specific gravity averaged 1·032; 95 per cent. of normal subjects yielded a specific gravity over 1·028 and 100 per cent. of normals yielded values over 1·026. Mosenthal in his test prescribes no restriction in diet or fluid intake but depends on the fact that the normal variability of specific gravity of the urine during the day is much diminished in nephritis. The urine is collected in two-hour periods during twelve hours of the day and the whole night urine is collected from about three hours after the evening meal until the patient gets up on the following morning. Normal values are a specific gravity of over 1·020 in any specimen with a variation of at least 9 points in the last figure between the highest and lowest value. A low specific gravity with a minimal degree of variation in any chronic nephritis demonstrates marked reduction of renal function. A high relatively fixed specific gravity occurs in passive congestion of the kidney but can be a normal finding in individuals who take insufficient fluid. An important part of the test is the volume measurement of the night urine, as nocturia is not only a common finding in chronic nephritis but is sometimes an early sign of the loss of renal efficiency. The normal average if no fluid is taken after supper in this test is about 400 c.cm., but may reach 725 c.cm. Values above the latter figure can generally be considered as abnormal.

The urea concentration test of MacLean and de Wesselow is a test of a similar order. It consists of the administration of 15 gm. of urea in 100 c.cm. of water to an individual, whose fluid intake has preferably been restricted somewhat for the previous day, followed by the estimation of the urea concentration in hourly specimens of urine obtained from immediately after the urea is given. Two such specimens are examined. Concentrations more than about 2·5 per cent. of urea are considered normal, concentrations, much below 2·0 per cent. in the absence of diuresis, are indicative of renal impairment of function.

RETENTION OF NITROGEN-CONTAINING BODIES

For the immediate purpose of this article, it is unnecessary to consider any other substance than urea which forms the largest part of the nitrogenous bodies in the urine. Study of urea excretion forms the basis of many tests of renal efficiency, and of these the most thoroughly investigated was that due to Addis. This observer and his collaborators showed that under standard conditions, in which the kidney was fully loaded by administration of water, and, if necessary, of urea, the rate of urea excretion is proportional to the blood urea and hence the ratio

$$\frac{\text{urea in 1 hour's urine}}{\text{urea in 100 c.cm. blood}}$$

is constant. They then demonstrated by ingenious methods that this ratio was proportional to the mass of functioning renal tissue and that it was accurate enough to be used as a measure of the functional capacity of the kidneys. Their test, unfortunately, is not of easy or general applicability, but it has been modified by van Slyke and his colleagues, who termed it the "urea clearance test." They use the ratio

$$\frac{\text{urea excreted per minute}}{\text{urea per 100 c.cm. blood}}$$

and have pointed out that it represents the volume of blood cleared of urea by the kidneys per minute. Under ordinary conditions, if the rate of excretion of urine is greater than 2 c.cm. per minute, which is known as the augmentation limit, the rate of urea excretion is proportional to the blood urea and the above formula applies; if, however, the urinary excretion is less than the augmentation limit a different formula for the clearance rate is necessary.

The test is carried out as follows. No special preparation of the patient is necessary, but if the test is carried out in the morning, for example, he should have a light breakfast without tea or coffee. The patient empties his bladder completely at, say, 10 a.m. and again at 11 a.m. and at noon exactly, so that two successive sixty-minute specimens are obtained. Blood is taken for urea estimation just after the 11 o'clock urine specimen is obtained. The data required are the volume and urea content of each urine specimen and the blood urea, the latter being assumed to be constant throughout the period of the experiment. If U and B represent the concentrations of urea in urine and blood respectively and V the number of c.cm. of urine excreted per minute, then if V is greater than 2 c.cm. per minute

$$\text{Maximum blood urea clearance} = C_m = \frac{U \times V}{B}$$

if, however, V is less than 2 c.cm. per minute

$$\text{Standard blood urea clearance} = C_s = \frac{U \times \sqrt{V}}{B}.$$

The average maximum clearance is 75 c.cm. per minute and the average standard clearance is 54 c.cm. The renal efficiency is then expressed as a percentage of these normal values. Thus, if the clearance is y, then the formula $\frac{y}{75} \times 100$ is used if the clearance is maximum, and the formula $\frac{y}{54} \times 100$ if standard clearance is estimated. A value is thus calculated from each specimen of urine and the results averaged. It apparently makes little difference whether standard or maximum clearances are determined as both values are affected in pathological conditions in about the same proportion.

In interpreting this test it is important to realize that there may be considerable variability in the values obtained in a single individual, and though the test is commonly used, this point is often forgotten. The mean values of estimations in a number of normal subjects have been shown to vary from 75 to 125 per cent. of the average. Thus in a single individual in whom the mean of a number of estimations might be 80 per cent. it is easily possible to get a single value much lower than this which could wrongly be interpreted as a sign of renal damage.

Before considering the application and interpretation of this test further it is necessary to consider the changes in blood urea content during progressive renal disease. In early stages of chronic nephritis, though urea clearance rates can be shown to be diminishing, there is sufficient compensatory mechanism to keep the blood urea within normal limits. It was shown by MacKay and MacKay, using Addis' ratio as test of kidney function, that it was not until the renal mass had been reduced to less than 50 per cent. that the blood urea commenced to rise above normal. In some cases even further diminution of renal mass was necessary before the blood urea became abnormal. It follows that estimation of blood urea provides the simplest and most definite test of reduction of renal capacity below the level of 50 per cent. of the normal. In healthy subjects blood urea varies between 0·017 and 0·040 per cent. but in the last stages of renal failure retention of urea may raise this value to 0·300 per cent. or even higher, so that values between say 0·040 per cent. and 0·300 per cent. correspond in rough proportion to a diminution of renal capacity from 50 per cent. down to 5 to 10 per cent. of the normal capacity when fatal issue is imminent. It follows that when the blood urea is raised urea clearance tests are unnecessary, but that when the blood urea is within normal limits an estimation of the urea clearance will throw light on that region of renal incapacity where function has been reduced to a level between 40 and 75 per cent. of the normal.

It is thus possible to watch the progress of cases of nephritis of various types. In an acute nephritis estimation of blood urea alone is often sufficient. During the initial stages the values may rapidly rise and, again, rapidly or more slowly fall as recovery sets in. Renal failure in alkalosis or in upper intestinal obstruction can be observed in the same way. In more chronic cases of toxic nephritis the urea clearance test will first reveal the extent of the renal damage, and diminishing clearance values can be demonstrated with progressive contraction of the kidney up to the point at which the blood urea rises and the prognosis becomes more threatening.

It must be stressed that numerical results must be interpreted broadly. Prognoses cannot be established on single estimations of blood urea or of clearance values but successive estimations may yield a good deal of information as to the progress of a case.

In investigating a case of suspected orthostatic albuminuria a convenient modification of the urea clearance test can be used. During the first hour the patient lies supine on a couch, head and shoulders raised forward with a pillow, and knees up to " flatten out " any lordosis. During the second hour the patient is up and about. The contrast in the protein content in the two specimens of urine so obtained may provide a striking demonstration of the diagnosis and the finding of a normal urea clearance is a valuable confirmation.

TESTS IN SURGICAL CONDITIONS

From the surgical point of view renal efficiency testing is of importance in any operation on elderly subjects or on nephritics, and particularly in any operation on the urinary tract such as prostatectomy.

No single test is of any real value apart from a clinical estimate of the patient's general condition. For prostatectomy, after observation of the degree of infection of the urine and of the degree of urinary retention, simple estimation of the blood urea is most informative. If the blood urea is normal the risk of precipitating uræmia is probably slight. If the blood urea is appreciably raised then drainage measures should be established in order to reduce the renal stress. With still higher figures such as, say, 0·120 per cent., slow decompression of the bladder followed later by suprapubic cystostomy, may result in a gradual fall of blood urea to almost normal levels, when further operation can be contemplated. As prostatectomy can often be successfully performed in individuals who, despite a somewhat raised blood urea, have a good general condition, a reasonably clean and moist tongue and no gross cardiac or pulmonary disease it is clear that the urea clearance test is unnecessary, apart from its possible inaccuracy when there is actual retention, even if the urine is obtained by catheter.

In America a frequently used test is the estimation of the rate of excretion of a dye, phenolsulphonephthalein, after its introduction by intramuscular injection. It has not been extensively adopted here as yielding no greater information than other tests. For the surgeon, however, the injection of a dye can be very useful in cystoscopic examination, for which purpose 3 to 4 c.cm. of a 0·4 per cent. solution of indigo-carmine is injected intramuscularly, and in normal cases definitely coloured urine should appear from both ureters within ten minutes. Delay in the excretion of the dye, or its absence from one ureter is of obvious value.

VASCULAR CHANGES IN NEPHRITIS

These changes are not exactly tests of renal capacity, but observations of blood pressure, cardiac size and the state of the retinal vessels must be included in estimating the progress of nephritic cases. In chronic cases with œdema, renal efficiency may be well maintained for long periods, but a rising blood-pressure corresponds generally to advancing fibrosis though it precedes considerably in time the appearance of nitrogen retention. In congestive heart failure renal efficiency tests may well illustrate the renal congestive state and the blood urea can be raised to moderate heights. When, however, in nephritis, with increasing hypertension and enlargement of the heart, signs of cardiac failure occur, such cardiac trouble is left-sided and a rising blood-urea denotes the true renal damage. In acute forms of nephritis retinal œdema, papillœdema and retinitis may occur and completely resolve, but true albuminuric retinitis is generally indicative of the late phases of chronic nephritis and of a very poor prognosis.

CONCLUSIONS

In estimating renal efficiency all the signs and symptoms of the disease present should be observed, assayed and interpreted together with the knowledge of the general prognosis of the condition studied. Apart from such observations, special tests of urinary specific gravity and volume, blood urea and urea clearance tests provide valuable additional information and a guide to treatment and prognosis.

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CLINICAL EXAMINATION OF THE URINE

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A GREAT deal can be learnt about the urine by naked-eye examination together with a few simple chemical and microscopic tests. This article will discuss the tests which can be carried out quickly by a general practitioner and not make any reference to more elaborate investigations such as are usually left to a clinical pathologist.

NAKED-EYE EXAMINATION

It is proposed to consider first the patient who complains that his " water is thick." He may bring a sample in a medicine bottle in his pocket. Generally it is possible to decide quickly whether or not the turbidity is of any significance. If the turbidity disappears on warming it was due to urates, which only means that the urine was concentrated. If the turbidity remains when the tube has been warmed then another test tube of urine should be taken and a few drops of acetic acid are added. A turbidity which clears up with acetic acid is due to phosphates and this also is not of much consequence. On the other hand, if the turbidity persists after warming and after acidifying it is probably due to pus, blood or bacteria.

Inspection of the urine is important also in the case of a male patient who has had gonorrhœa. In these circumstances the urine should be carefully examined for threads. If these are found they should be teased out and stained or sent to a pathologist for examination.

Now that so many patients are being treated by the ketogenic diet or by mandelic acid it may be useful to say something about acidity. When a urinary infection is being treated along these lines the urine must be kept acid and the most convenient indicator to use is methyl red. The optimum effect of the treatment is obtained when the acidity is kept at 5·3 or below on the pH scale. At this point methyl red gives a slightly pink colour to the urine. It is the aim of the treatment to maintain such a degree of acidity that each specimen passed gives a slightly pink colour with the methyl-red indicator. The appearance of a yellow tint on addition of methyl red to the urine indicates that the urine is too alkaline and consequently the intake of ammonium chloride should be increased.

Albumin.—The most convenient test for albumin is the boiling test which needs no description. It is sufficient to recall that any precipitate on boiling indicates either albumin or phosphates and these are distinguished by the fact that a turbidity due to phosphates disappears with a drop of acetic acid, whereas albumin does not. If the reaction of the original urine was alkaline it should be made acid before boiling or a precipitate of protein may be missed. Slight traces of precipitate are best seen by illumination of the tube with a shaded light, holding it against a black background.

Sugar.—The simplest test for sugar is by Benedict's solution.

To one inch of Benedict's reagent in a test tube add eight drops of urine and boil for two minutes. If sugar is present the fluid changes from a clear blue to a turbid yellow or brick-red colour. With only a trace of sugar the fluid merely remains green and turbid. In a doubtful case let the tube stand until the deposit has settled down, then hold the tube up and look at it from below. Only when a definite yellowish-red deposit settles to the bottom is the test for sugar positive.

For practical purposes it may be said that Benedict's solution is only reduced by carbohydrates such as glucose, lactose and pentose. If there is any doubt as to which of these is present a fermentation test should be carried out, using ordinary bakers' yeast. A positive fermentation test is given by glucose but not lactose or pentose. In the majority of cases these tests will decide whether or not glucose is present. Further investigations are only likely to be needed when the Benedict test is positive and the fermentation test is negative, and in these circumstances the urine should be sent to a clinical pathologist for an opinion.

Ketones or acetone bodies.—There are two tests for ketones or acetone bodies in the urine, the nitroprusside test (Rothera) and the ferric chloride test (Gerhardt). The nitroprusside test is a delicate one and gives a positive reaction in a number of different conditions many of which are of no serious pathological significance. A great advantage of this test, however, is that if it is negative it can be said for certain that acidosis is absent. If the nitroprusside test is positive the ferric chloride test should be carried out and if this also is positive it should be realized at once that the patient may be in a dangerous condition and require immediate treatment.

To carry out a nitroprusside test take a clean test tube and shovel into it about one inch of the mixed crystals of ammonium sulphate and sodium nitroprusside and then half fill the test tube with urine. Then add half an inch of liquor ammoniæ fortis and mix well by inverting the tube. A purple permanganate colour indicates the presence of acetone bodies. It appears immediately when the test is strongly positive and only after a few minutes with weak reactions.

For the ferric chloride test take one inch of urine in a test tube and add ferric chloride 10 per cent. or liquor ferri perchlor. drop by drop until no further precipitate of ferric phosphate is formed. Filter, and to the filtrate add more ferric chloride. A claret red colour indicates acidosis.

A similar colour may be given by substances excreted in the urine after the administration of salicylic acid, aspirin or antipyrin. These false positives may be distinguished by the fact that the colour is still obtained if a previously boiled specimen of urine is tested. Prolonged boiling of the urine greatly reduces and finally causes the disappearance of a positive reaction due to acetone bodies.

Chlorides.—A rough qualitative test for chlorides is easily carried out and may be of value particularly in cases of intestinal obstruction and pneumonia, in both of which conditions the chlorides of the urine are greatly decreased.

To about half a test tube of urine add a few drops of concentrated nitric acid and then a few drops of 10 per cent. silver nitrate. A similar quantity of normal urine should be treated in the same way as a control. When chlorides are present in the normal quantity a heavy cloud precipitate appears and settles to the bottom of the tube. When the chlorides are diminished or absent the solution will appear very milky or opalescent.

MICROSCOPIC EXAMINATION

Microscopic examination is necessary to decide whether or not the urine contains blood, pus, casts, crystals or bacteria. The simplest and quickest way of carrying out the test is to take a drop of the urine and run it into the chamber of a Fuchs-Rosenthal slide, such as is used for the examination of cerebrospinal fluid. This differs from the ordinary blood count slide in that it is ruled to enclose sixteen square millimetres and has a depth of one-fifth of a millimeter. If a drop of urine be allowed to settle in this it can be examined in a few moments with the microscope and it will be seen at once whether or not the urine contains pus, blood, casts or crystals. Advantages of this method are that no centrifuging is necessary, and with a little experience the results of the tests for pus can be expressed in a quantitative way.

Another method of carrying out a microscopic examination is to centrifuge down the urine and place a drop of the deposit on an ordinary slide and cover this with a cover glass and examine with a one-sixth objective. Or, if no centrifuge is available the urine may be allowed to stand in a conical vessel for a few hours in a cool place until a deposit has formed. A drop of this is collected in a pipette and examined beneath a cover slip.

It is an easy matter also to carry out a simple bacteriological test. All that is necessary is to take a drop of the deposit and spread this on a clean slide and stain it with Gram or methylene blue or Ziehl-Neelsen's stain. Instructions for this are given in books on clinical pathology so it is not necessary to do more here than say that these tests are not difficult and that if the general practitioner carried them out more frequently it would add greatly to the interest of his work.

THE TRANSMISSION OF SPECIMENS TO THE LABORATORY

Before specimens are sent to the laboratory for examination it is often desirable to get in touch with the pathologist and explain the nature of the case and ask how the specimen should be collected. Within recent years there has been a great increase in the number of practising clinical pathologists, and facilities for obtaining help of this sort are now available in most of the larger towns in this country. It is obvious that the general practitioner will get more help by discussing the case with a medical colleague who has specialized in clinical pathology and is practising in his district than by posting pathological specimens to a remote laboratory. Any practitioner who is ignorant of the whereabouts of the nearest clinical pathologist can get information on this point from the secretary of the Clinical Pathologists Association* or the consulting pathologists group of the British Medical Association.

Specimens of urine for bacteriological examination should always be collected in a sterile bottle. It is not always necessary to collect a catheter specimen. For men patients all that is necessary in most cases is to collect a mid-stream specimen direct into the bottle. With care a clean specimen can be obtained also from a woman patient and a preliminary examination of this can be carried out before deciding whether or not catheterization is necessary. If the specimens are to be sent through the post the bottle should be wrapped round with some absorbent material and packed in a suitable container. The package must be marked "Pathological specimen—urgent, with care."

In conclusion, it is well for the practitioner to recollect that a pathologist cannot be expected to make a diagnosis of a patient's disease by examining a specimen of urine. He can only answer such questions as whether or not the urine is infected or contains some abnormal constituent, such as sugar or cystin. He is more likely to be of practical assistance if he has some knowledge of the nature of the case.

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LUMBAR PUNCTURE IN GENERAL PRACTICE

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TO-DAY, both as a diagnostic and as a therapeutic measure, lumbar puncture is often essential. Yet, this minor surgical procedure of tapping the spinal subarachnoid space has only been in general use for about forty years. Steps leading up to its introduction were, first, the experimental injection of fluids through the theca in the dorsal region by Corning (1885), followed by the draining of fluid at the lumbar level in cases of tuberculous meningitis by Essex Wynter using a Southey's tube, and later Quincke's elaboration of a technique practically identical with that employed to-day.

The lumbar level is chosen for puncture by reason of the fact that the lower end of the cord, or conus terminalis, in the adult terminates at about the upper part of the body of the second lumbar vertebra. No damage, therefore, to the cord can occur when puncture is performed through the third or fourth lumbar interspaces. In an attitude of flexion with the trunk bent well forwards, the tail-end of the cord rises slightly within the spinal canal. This fact is specially important in dealing with infants, as at birth the cord terminates behind the body of the third lumbar vertebra.

With a little skill and a due amount of care the technique of lumbar puncture can readily be acquired. The occasions for its use as a valuable and often essential diagnostic aid in general practice are frequently recurring.

INSTRUMENTS AND METHOD.

Essentials :—

(1) Two lumbar puncture needles.

(2) Two or three sterile glass test-tubes, best fitted with sterilized rubber corks, and kept in separate wooden containers for ease and safety in transport.

(3) A small bottle of iodine, and another of collodion.

(4) A packet of sterile cotton-wool.

(5) A compact portable spirit-sterilizer, to boil the needles before and after use.

(6) A 1 c.cm. glass hypodermic syringe with fine dental needle, and a small bottle of 2 per cent. novocaine.

[(7) A simple manometer, for pressure estimations].

Needles should always be chosen with care. A fine lumbar puncture needle (bore no. 17 standard wire gauge) is preferable to a thicker one (no. 19 or over), as it is less likely to cause pain. It is a common error to imagine that a thick, wide-bore needle will tap fluid more easily. Except when a fluid is very purulent or highly albuminous and readily coagulable, it will flow just as readily through a fine as through a thicker needle. Needles made of stainless steel, or chromium-plated, are commonly used, while those of nickel, or, more expensive, platino-iridium, have the advantage of greater flexibility and a more remote chance of breaking.

The point of the needle should be sharp with short, not long, cutting edges. If, in use, the needle strikes bone the point often becomes slightly bent in which case it must be reset by the instrument maker, as attempts at lumbar puncture with such a needle will give rise to unnecessary pain and failure to obtain fluid. A good needle has also an accurately fitting stylet which can readily be withdrawn, and the sides on which the points of needle and stylet are bevelled are indicated at the handle-ends by a pin attached to the side of the stylet-head which fits into a hole or groove on that side of the needlehead corresponding to the bevelling at the point. The sharp edges of the needle's point should be directed up and down the spinal axis and not transversely, as the long up and down fibres of the ligamentum flavum and of the dura mater are more easily pierced and not torn in this manner.

Technique.—Lumbar puncture except for the prick of the needle entering the skin should be a painless operation. Should the point of the needle, however, accidentally come in contact with bone, great pain is caused, as the periosteum is highly sensitive. A nervous apprehensive patient, by jerking or arching the spine, can easily upset the operator's judgment of anatomical landmarks, and through muscular spasm can exert a powerful grip upon the needle, hindering its passage. To reduce pain to a minimum it is best in the adult to anæsthetize the skin at the chosen point of puncture with a small intradermal injection of 2 per cent. novocaine, using a 1 c.cm. syringe with a fine dental needle. In children a light general anæsthetic, usually ethyl chloride, is preferable, which of course demands the co-operation of another qualified person. In many instances, however, the dulling of the senses incidental to the illness obviates the necessity of an anæsthetic.

A major point in the successful performance of lumbar puncture is getting the patient into the correct position. This is one in which the patient lies on his side, usually the left, close to the edge of the bed with the knees well drawn up and the head bent forwards, so that the forehead approximates to the knees. The most salient part of the spine in relation to the edge of the bed is the lumbar region. With the head, shoulders and hips in proper alignment lateral bending of the spine is prevented. A pillow should be placed under the side of the patient's head, the underlying arm is kept well forward, and with both hands clasped under the knees a greater degree of flexion of the spine can voluntarily be obtained. When obesity or breathlessness prohibit marked flexion, the posture assumed must imitate as closely as possible that just described. With young children the correct position needs to be maintained with the aid of a nurse or assistant placing one hand on the patient's head and one beneath the knees to draw the head and knees together. A little time and care spent in getting the patient into the correct position prevents many a painful and ignominious failure in obtaining cerebrospinal fluid.

Next, the operator by taking a line joining the highest points of the iliac crests notes the point at which this line crosses the spine, which is usually just below the tip of the spinous process of the third lumbar vertebra. The needle should enter through this interspace or the one below it. After careful cleansing of the skin locally and dabbing it with iodine, the operator presses firmly with the point of the forefinger of the left hand applied to the lower edge of the third lumbar spinous process (or of the fourth as the case may be), and with the right hand passes the point of the needle through the skin just below the tip of the left forefinger. As pain may be felt and the patient flinch, to keep the point of puncture in accurate alignment just below the third vertebral spine, the thumb and middle finger of the left hand can be employed to aid the forefinger in keeping the skin from sliding sideways over the boney processes. The point of the needle is directed slightly upwards, at an angle roughly of 75 degrees, and the plane of the needle must be perpendicular to vertebræ, with point of puncture, cervical and dorsal spine and coccyx, all in a straight line. The needle is gently pushed on and at a depth of half an inch in the infant to a depth of four inches in the adult fluid should escape on withdrawing the stylet. Quite often at these depths of puncture a slight extra resistance can be appreciated as the point of the needle pierces the membranes. A twist or turn of the needle in some reluctant cases may be all that is needed to start the flow. To push steadily onwards is always unwise, as fluid obtained, if any, is usually heavily contaminated with blood from puncture of the veins lying on the posterior surface of the vertebral bodies. Rather, almost withdraw the needle, and again guide it forwards in careful relationship to the various points of correct alignment. It is better to try again at a lower interspace than to make repeated attempts in the same one, as the muscle trauma will probably cause blood to appear in the fluid, and if the dura has been lacerated in several contiguous places post-puncture leakage is liable to occur producing severe headache. On withdrawing the needle, the point of puncture in the skin is sealed by a small wisp of cotton-wool soaked in collodion. After and before use a needle should always be boiled, as attempts at sterilization with spirit after puncture perhaps of a purulent meningitis are unreliable.

CAUSES OF FAILURE

The commonest causes of failure in lumbar puncture are want of attention in getting the patient into the correct position, and faults in the needle (bending due to striking bone). With a bent needle, that portion outside the skin may appear to be perpendicular and in proper alignment with coccyx, cervical spine and occiput, and internally the point may be deviated so as to strike the meninges at a tangent. A genuine "dry puncture" is a rare occurrence and possibly accounted for by a high degree of purulence, or by an excessive coagulability due to high protein content. In accidental contamination with blood the fluid run in small quantities into two or three test tubes becomes gradually clearer, while in a "blood-stained fluid" the blood is intimately mixed, giving a red colour throughout or a yellowish colour (xanthochromia) even after centrifugalizing when the date of the hæmorrhage has been less recent.

THE MANOMETER

An estimate of the fluid pressure may be of importance in a suspected case of meningitis or of encephalomyelitis, and more so in cases of spinal and cerebral neoplasm and traumatism. Ordinarily the pressure is roughly gauged by noting whether the fluid escapes forcibly in a jet or drop by drop. An easy and more accurate method is to use a needle with a two-way stop-cock, to one opening of which has been attached a piece of rubber tubing, which once the needle is in position can easily be connected with a length of glass tubing of a bore not greater than 2 mm. and not

FIG. 1.—Lumbar puncture: needle with two-way stop-cock in position, to one opening of which is attached manometer.

less than 1 mm. (Ayer), and graduated in fractions of a centimetre. The length of the glass tube is about 300 mm., or two pieces of 150 mm. each can be joined end to end with rubber tubing. Roughly, normal pressure readings for adults and children lie between 100 and 200 mm., while those approaching 300 mm. and over are definitely abnormal.

Quantity of C.S.F. to withdraw.—For ordinary diagnostic purposes in meningitis, poliomyelitis and other infective conditions 8 to 10 c.cm. are necessary for a full pathological examination. If in addition the Wassermann reaction of the fluid is to be tested a further 1 to 2 c.cm. should be allowed. When cerebral tumour, however, is suspected, only 2 c.cm. should be withdrawn, and the lumbar puncture so manipulated by means of the stylet that the fluid escapes slowly drop by drop. A manometric estimation can also be taken with the loss of very little fluid. In spinal-block, by tumour for instance, the fluid in the cerebral cisterns and upper spinal theca may be shut off from that at the lumbar level. An indication of partial or complete block can be obtained by performing Queckenstedt's test. Thus during lumbar puncture light pressure at the sides of the neck over the jugular veins will cause normally the fluid to escape under greater pressure. A negative test implies obstruction at some point in the spinal subarachnoid space.

In sending a fluid to the laboratory one should always state the provisional diagnosis, as with a limited quantity of fluid certain tests have a much greater value than others in different diseases. Thus in meningitis, the type of cells present, the state of the chlorides and of the glucose, presence or absence of organisms, are of greater importance both in diagnosis and prognosis than the percentages of albumin and globulin. Roughly speaking, reduction of the chlorides (normal 750 mgm. per 100 c.cm.) and glucose (normal 45–55 mgm. per cent.) of the cerebrospinal fluid is confined to the various forms of infective meningitis, and does not occur in poliomyelitis or forms of encephalo-myelitis.

CLINICAL USE OF LUMBAR PUNCTURE

In general practice conditions for the diagnosis of which lumbar puncture is most urgently demanded are all forms of meningitis, meningeal involvement from mastoid or middle-ear disease, poliomyelitis, and various forms of " benign lymphocytic meningitis " and encephalomyelitis which symptomatically may resemble tuberculous meningitis closely and often can be diagnosed only by examination of the cerebrospinal fluid. In head injuries the presence of meningeal bleeding can be ascertained and a manometric measurement of pressure will decide rationally for or against employing hypertonic solutions by the bowel or intravenously to reduce intracranial pressure. Traumatic coma can exist with a diminished as well as with a heightened intracranial pressure. Less urgent but equally important is the Wassermann reaction of the cerebrospinal fluid for the recognition and treatment of neurosyphilis. Therapeutically, it is in meningococcal meningitis that the earlier the diagnosis by lumbar puncture, the greater are the chances of recovery employing antimeningococcal serum intrathecally.

After-effects of lumbar puncture.—Headache is the most frequent complaint, though much less common in children than in adults. Measures to prevent headache are to give a long warm drink of milk, tea or coffee after the puncture, and for the patient to lie in bed for eight to twelve hours. Aspirin, caffein and phenacetin tablets help to relieve mild headache, but with more severe and obdurate pains in the adult pituitrin, ½ to 1 c.cm. twice a day for one or two days, can be recommended.

GENERAL PRACTICE

VI—PANEL PRACTICE

BY H. GUY DAIN, M.B.

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HOW has the National Health Insurance Scheme of "Panel Practice" affected the work of the medical practitioner? Has it any advantages and, if it has, what are they? What alterations does panel practice make in the outlook of the doctor and what difficulties does he encounter and how should he meet them? If this article is able to answer this series of questions it will perhaps be helpful to any who are considering the type of medical practice most attractive to work and which will provide them with a reasonable livelihood; and perhaps also it will be found to contain suggestions for those who are already engaged in practice.

The effect of the provision of a general practitioner service for the workers, for a third of the population, now about seventeen million people in Great Britain and Northern Ireland, must have had enormous effects, and effects of varying kinds. It has made a medical service available for many workers who previously did not or could not afford it. In the first place it has necessitated the work of large numbers of additional doctors in purely working-class areas. The large numbers of patients who signed on with the doctors practising in such areas when medical benefit started provided one of the earlier problems of the administration of the service. In a few years, with the good will of all concerned, that difficulty was soon dealt with. Fresh doctors came in and the agreed limitation of lists with the provision of the arrangements for partners and assistants has stabilized that problem. In the result a living is provided for doctors in areas that before could not support a doctor and their services are there for others than the insured. On the other side of the picture, in country and better-class suburban areas, doctors found that the servants who had previously been paid for by their employers as private patients were now required to be treated as insured persons at the capitation rate. The problems of persons who did not produce their medical cards, of those who lived long in an area before choosing a doctor in that area, and of domestic servants who changed about rapidly, all were grievances of considerable size that have largely been cured in the course of time as both patients and doctors became more used to the machinery.

ADVANTAGES

The advantages of panel practice are considerable, and outstandingly first should be placed the elimination of any financial consideration as between doctor and patient. The patient does not have to consider whether his condition is sufficiently serious to justify seeing a doctor and the payment of the fee, but he can consult or send for his doctor as the condition may appear to him to require without worry as to cost. On the other hand the practitioner is free to provide whatever service the patient may require (within the contract) and with the comforting feeling that the patient or his friends will not be anxious about the size of the bill. Surely, in the proper relationship between patient and doctor, this is an outstanding advantage. Any fears that this might be offset by unjustifiable and thoughtless demands on the doctor's time and services have been proved to be groundless and, speaking generally, the consideration which insured persons show and have shown to their doctors matches the consideration which doctors show to their insured persons. The patient chooses his medical practitioner and either can change if they are unhappy about it. Then the pay is certain; each quarter (or more frequently if necessary) the Insurance Committee cheque arrives punctually for the agreed number on the list. There is no long waiting and bad debts do not exist. It has to be remembered that this advantage has probably weighed with the arbitrators when fixing the amount of the capitation fee so that it is likely that this advantage has been bought and paid for in the small size of the nine shillings per head at which the capitation fee now stands. However, there it is as a definite advantage over other practice when accounts have to be sent in before any payment can be expected and then perhaps no payment until the account has been sent several times or then perhaps none at all.

After many considerations the payment remains the same for all (nine shillings per head per annum) whether the practice is urban or rural, slum or suburban. The rural practice provides more visits in proportion to the surgery attendances and the rural doctor frequently is required to give services that in a town are better provided in the properly equipped hospital near at hand. However, the greater distances are provided for by the mileage fund and, on the average, less services are required in the country than in the closely populated town areas.

When the difficulties of getting persons in these enormous numbers on to doctors' lists and of paying the doctors proportionately were realized, it was seen that there must always be a number who would not choose a doctor till they are in want of his services. It was also obvious that the money to pay for their medical benefit was there, as well as their right to the medical service. It was then agreed that in return for the payment to them of all the moneys in the pool the doctors collectively would accept responsibility for all insured persons including all those who had not chosen a doctor. This enables every insured person to get immediate treatment even if he has not previously signed on with a doctor. Arrangements are also made to provide that he or she may obtain service when away from home (in England, Scotland and Wales) as a temporary resident or in an emergency.

It is evident from these agreements that the insured person is entitled to a general practitioner service without any payment at all times and that an insurance practitioner cannot claim to be paid anything by the patient for such services except in exceptional circumstances. The doctor can, of course, claim to be paid by the patient for services outside the contract, of a specialist nature.

Evidence of the insured person's title to benefit has been provided for very ingeniously by the medical card, which is issued by the Insurance Committee on the authority of the person's Approved Society to each insured person who comes into benefit. The card contains rules for the insured person and provides opportunities for the insured to be accepted by a doctor, to change doctors, or to get service when away from home. It is a clever arrangement and, in use, works both effectively and smoothly.

The doctor's contract with the patient he has accepted gives the patient the right to get service whenever it is required and in practice it happens that a call to an insured person at night is responded to when the doctor would possibly refuse to go out in the night to a person with whom he was not under contract to attend. This places the insured person in a privileged position as compared with the uninsured. It is often assumed by uninformed persons that the insured patient gets poorer service than private patients and, while this may in isolated cases have been true in the early days, the medical profession has become more accustomed to work under a contract and it has always been the standard of the medical profession to give equal service to all.

RECORDS

An advantage to both doctor and patient of the National Health Insurance Service is the system of record keeping which establishes a record for each insured person which follows him through his insured life. This record is able to provide the doctor with a history of his patient's illnesses from sixteen years upwards and the system has impressed on doctors the advantages of keeping records of the illnesses of all their patients. The information required on a permanent and continuous record is not detailed notes such as are taken by a clinical clerk in hospital but a brief statement of salient features, diagnosis and treatment, and the envelope record provides the opportunity of keeping together pathological and specialist reports that may have been obtained. The obligation imposed under the present contract to keep a record of all attendances and visits was really designed to compel the doctor to have the record in front of him when he is seeing the patient and so provide the easy opportunity to make the appropriate clinical note. The irksomeness of keeping these records which found such strong expression by doctors who had previously not kept records disappears with the adoption of simple arrangements of working, and young doctors coming into the service are used to it from the start. General medical practice must have been increased in efficiency as the result of the insurance record system.

DRUGS

The method of supply of drugs for this service has also brought about great alterations in practice, probably to the advantage of all parties. Whereas, before this N.H.I. service, many doctors dispensed for all their patients, now, except in rural areas, a doctor prescribes for his insured persons and only dispenses in an emergency. He is in the position of being able to order for them any medicines he may consider necessary, however expensive. The large sums that are paid every year for insulin should be noted in this connection. A great deal of controversy has taken place on the question of " extravagant " prescribing and, while it is true that the patient must have the medicines he requires, however expensive, it is also true that it is essential that the doctor should behave reasonably in the matter of cost. It is fortunately a fact that many of the most valuable and useful drugs are quite inexpensive so that use may be had, when required, of really expensive remedies without the average or total cost being other than reasonable. Apart from the question of cost a practitioner should not order proprietary preparations of which he does not know the composition. Consequently, he will not be ordering expensive proprietary articles, and will take care to use the less expensive of two remedies of equal value. In fact, he will take a little trouble to understand how to get the best results at the least cost to the drug fund. With a little intelligent thought, economies can be effected without loss of efficiency and the knowledge thus acquired is an asset to the doctor in the dispensing which he may be doing for his private patients. To help in this matter and to save the doctor's time in writing prescriptions a National Formulary[1] is now available and is adopted in most areas. This contains a large number of prescriptions in common use for internal and external purposes. A study of this Formulary will well repay the time spent on it and is a valuable education in the art of prescribing.

CERTIFICATES

In the consideration of the National Health patient a further problem has often to be considered. When his tale has been told (or her's as the case may be), when the necessary examinations have been made, the possibilities of diagnosis and treatment considered, instructions and perhaps prescriptions given, then the other problem may arise. Is the insured person capable or incapable of work? In most cases the answer is easy and obvious and both doctor and patient are clearly agreed that he is or is not capable of doing his ordinary work, but there are many occasions when the question is not so easily settled. On the one hand is the patient with a condition of which he does not appreciate the gravity and possibly afraid if he " loses time " at work he may lose his job. Here the doctor has to weigh the risks and sometimes let the patient carry on at work and sometimes insist that he takes a " declaring on " certificate and goes home to bed. And on the other hand, there is the patient whose condition does not appear to be incapacitating but who fears to continue at work, regarding it as more serious than it is. Or perhaps he is unemployed and has no work to go to and is anxious to persuade the doctor that he could not work and should have a certificate. It is here that the practitioner must exercise most care and not a little tact. If it is only confidence that is required, this may be instilled by some encouraging explanation of the symptoms, and before refusing to issue a certificate of incapacity the doctor must be very sure of his ground, but he should not be deterred from refusing by the fear that the patient will change to another doctor. A reputation that a medical practitioner is easy in the matter of the issue of certificates may attract some patients but, if it does, it attracts undesirable ones and the reputation of a doctor for fairness and firmness in this matter attracts more desirable patients and, in the end, saves much both in time and temper in the course of the years.

There is a further point of importance in this question of incapacity to be remembered. Approved Societies are the custodians of the funds for their members and are responsible for the proper spending of money on the various benefits. In the case of sickness and disablement benefit the patient makes a claim and supports it with evidence of incapacity which is usually a doctor's certificate. With such a certificate payment in the first instance is practically certain to be made, so that a doctor's certificate of incapacity is almost as good as a cheque on the National Insurance Funds, and this fact should always be remembered when certificates are issued. It is true that, if there is reason to doubt the insured's incapacity, the Society may refer the person to the Regional Officer for a second opinion on the capacity or incapacity of the member; but the doctor, deciding on incapacity, should take his own responsibility on the matter, not issuing a certificate of incapacity and leaving the Society to challenge the decision, but, if he feels unable to decide, himself referring the question of incapacity to the Regional Medical Officer. As the result of experience, a set of certification rules has been drawn up which must be strictly observed. These provide, among other things, that for a second certificate there must always be a second examination and that the certificate relating to a particular examination must be issued within twenty-four hours of that examination.

SPECIALISTS AND CONSULTANTS

It is an unfortunate circumstance or series of circumstances that first the Great War and then the financial disturbance that followed have prevented this great social insurance scheme developing as was hoped and expected. From time to time its finances have been depleted and it remains a general practitioner service when it might have been developed to provide a full medical and surgical service with the necessary special treatments. There are, however, signs that part of this may come about and until this materializes the insured person's doctor undertakes to put him in the way of obtaining such special services as are provided locally for the citizens of the area, such as those for venereal disease and tuberculosis. The tuberculosis arrangements provide for the full exchange of information between the insured person's doctor and the tuberculosis officer and make it clear at all stages of the treatment which of these two is responsible for the care of the patient.

In the matter of a second opinion there is available for the doctor the Regional Medical Officer who will, if asked by the doctor, express an opinion on the medical or surgical aspects of the case as well as on the capacity or incapacity for work of the insured person. Apart from this the insured person gets his consultant and specialist service in the ordinary way as a private patient or through the out-patient departments of hospitals.

REGULATIONS

Finally, there is in operation for the control of this national service a set of regulations and terms of service for doctors that are voluminous in extent and provide for practically everything that can happen to a doctor and patient and for fair play for both parties. For these regulations it can be said that they do not interfere with the proper relationship between doctor and patient and that the doctor need not be too concerned about them for they will not obtrude themselves so long as he deals with his patients fairly and reasonably and, on occasion, they will protect him against complaint.

CONCLUSION

Here then is a service based on the family doctor and capable of development in two directions, to include other services and to include other persons, e.g. dependants of the present insured. It is based also on free choice and the normal relation of doctor and patient and does not interfere with these. It is an insurance scheme and the premiums are partly paid by those who benefit. It is well administered and can claim to be a great success. In the future development of medical services for the people it could well be used as a foundation for the complete service.

Reference

[1] Lilley, E. L.: "The National Formulary." *The Practitioner*, 1935, cxxxiv, 798.

PRACTICAL NOTES

RELIEF OF PAIN

Patients rightly regard relief of pain as next in importance to saving of life as the function of the medical practitioner. R. W. Waggoner (*The Journal of the American Medical Association*, September 26, 1936, cvii, 1049) in insisting upon this in a helpful review of the subject, states that when pain has served its purpose as a warning it should be eradicated as soon as possible. After discussing the analysis of the type of pain and indicating that the causative factor should be removed if and when possible, Waggoner offers the following prescriptions (among others) as suitable for certain types of pain.

For the root pain of tabes dorsalis, spinal cord tumour or radiculitis :—

℞	Acetylsalicylic acid	3½ grains
	Phenacetin	2½ grains
	Caffeine	½ grain
	Codeine sulphate	¼ grain

To be given in a capsule, 1 or 2 at onset of pain and repeated in an hour if necessary.

For headaches of a reflex type or associated with anxiety, excitement or depression, the same can be used with the omission of the codeine.

For headaches associated with gastro-intestinal upsets and toxic factors, such as alcohol, the following is suggested with the warning that habit formation and poisoning must be guarded against :—

℞	Acetylsalicylic acid	5 grains
	Acetanilide	1½ grains
	Extract of hyoscyamus	¼ grain

This is given in capsules, one every two to four hours as needed for pain.

For chronic infective arthritis the pain is best relieved by salicylates and the following is offered as a suitable mixture :—

℞	Acetylsalicylic acid	3½ grains
	Magnesium oxide	3½ grains

This is given in capsules, one every three hours.

(Note : The prescriptions have been freely adapted for British usage.)

ENDOCRINES AND THE ENLARGED PROSTATE

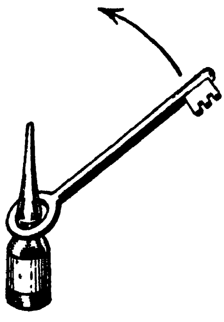
Although the subject has barely reached the stage when endocrine preparations can be definitely prescribed in the treatment of enlarged prostate it is pointed out by S. Zuckerman (*Proceedings of the Royal Society of Medicine*, October, 1936, xxxix, 1557) that modern work supports the view that benign enlargement of the prostate is due to action of an œstrogenic substance. It is probable that the normal balance between the male hormone and the œstrogenic hormone is upset rather than that there is gross defect in the male hormone, and it is suggested that when preparations of the male hormone sufficiently concentrated to be of value in treatment become available in this country, the treatment will be largely empirical and the dose will vary considerably from patient to patient. Solutions of crystalline testosterone and testosterone propionate in oil are undergoing clinical trial at this moment, the latter being apparently the more effective preparation.

OZONE AND CYSTITIS

A novel method of treating chronic cystitis resistant to other forms of therapy is described by W. Bircher (*Münchener medizinische Wochenschrift*, October 30, 1936, lxxxiii, 1792). This consists of using a specially designed apparatus whereby a mixture of oxygen and ozone is passed into the previously emptied bladder through a small calibre silver catheter. After ten seconds the gas is expelled through the catheter and the bladder then filled again. This is repeated for five times and on the occasion of the last filling, the gas is retained as long as possible, the average time being about ten minutes. After a few days of this treatment the urine has begun to clear in patients who, for as long as six years, have suffered from chronic infection. It is claimed that the treatment is applicable to either sex and may also be valuable in cases of pyelocystitis for clearing up an infection of the lower part of the urinary tract. Other measures to deal with the primary cause of the infection must, of course, be undertaken and the general resistance of the patients increased. For those treated with ozone all the usual measures, including urinary antiseptics and bladder wash outs, had failed.

THE OPENING OF AMPOULES

A useful device for the opening of glass ampoules is suggested by H. Stanka (*Münchener medizinische Wochenschrift*, October 2, 1936, lxxxiii, 1646). He points out how often the glass splinters and even when it is held between cotton-wool swabs or some such device, opening is not always satisfactory. The use of the handle of a key, indicated in the illustration, gets rid of all these difficulties and the use of a small file round the neck of the glass vessel before using the key is, of course, desirable if possible. Even ampoules of thick glass can be opened in this way if the neck is prepared first, and speed is one of the great advantages claimed for the method.



COMMON SALT FOR FATIGUE

Much recent work on sodium chloride has indicated its importance in the treatment of dehydrated states such as in profound shock or after vomiting or prolonged diarrhœa. The blood chloride level in Addison's disease of the suprarenals has also been studied and salt administration in this malady has been also an interesting advance of recent years. A. S. Johnson (*The New England Journal of Medicine*, September 3, 1936, ccxv, 438) has taken the matter a stage further for he believes that the administration of salt is beneficial for patients with a fatigue syndrome but who were not suffering from Addison's disease. The chief complaint of his patients has been weakness, easy fatigue, disinclination for physical activity, no feeling of recovery after a sound night's sleep, increased nervousness and irritability. With some patients precordial pain, palpitation and even definite breathlessness on exertion have been noted. The patients were mostly in the third and fourth decades, and the one laboratory finding common to them all has been a low chloride level in the blood. An increase of 2 to 6 gm. in the patients' daily intake of salt is followed in four or five days by complete relief of the symptoms. Conversely, deprivation of this extra salt is followed, after a like period of time, by a reappearance of the symptoms. Usually the patients gained about 2 lb. in weight during the first fortnight of treatment, but there is no further gain. No relapse has been experienced as long as the extra salt has been continued.

VITAMIN C FOR PURPURA HÆMORRHAGICA

Various investigators have announced their experiences of the close connection between the effects of vitamin C and the blood platelets, capillaries and clotting mechanism. E. Lorenz (*Wiener klinische Wochenschrift*, September 25, 1936, xlix, 1195) has applied these results in the treatment of a case of severe purpura with thrombocytopenia. After a preliminary observation period, during which other methods of treatment failed to have any effect upon the number of hæmorrhages or the blood platelets, a patient was given intravenous injections of vitamin C in the form of ascorbic acid (25 mgm. on the first day, followed by 50 mgm. daily). After the second day's injection there was a diminution in the hæmorrhages and after five days the bleeding time was found to be normal and after about fourteen days the platelet count began to rise. At this time extra vitamin C was also given by the mouth and at the end of a little over three weeks the blood findings were normal and there were no longer any hæmorrhages. It is suggested that this form of treatment should be used to secure a rapid return to the non-bleeding phase of this condition, pending consideration of any further and more radical treatment.

A NEW TEST FOR PREGNANCY

Acting upon the assumption that since a pregnant woman passes an anterior pituitary-like substance in her urine and is therefore unlikely to be sensitive to its intradermal injection, G. C. Gilfillen and W. K. Gregg (*American Journal of Obstetrics and Gynæcology*, September, 1936, xxxii, 498) have carried out certain tests which suggest that antuitrin-S can be used in this way for the diagnosis of pregnancy. An ordinary 2 c.cm. hypodermic syringe and 26 gauge needle are used for the intradermal injections and it is important that the skin, syringe and needle be cleansed with sterilized water and not alcohol. It is also important that the injection is given exactly into and not under the skin. Two minims of antuitrin-S are injected intradermally and the reaction is read after half-an-hour. If there is a slight reaction another half-an-hour is waited, but if there is no reaction at the end of this time, the patient is considered to be insensitive. The reaction consists of an area of erythema around the site of injection, measuring in diameter from 7 to 40 mm. A patient who is pregnant or who has aborted and retained some live decidual cells does not react to antuitrin-S. A patient who is not pregnant or does not have any retained living tissues of the products of conception reacts promptly to the skin test. Case reports seem to indicate that the test is accurate, time-saving and extremely simple to perform and so far has proved more delicate than Aschheim-Zondek test in border-line cases.

FEVER THERAPY IN TABES DORSALIS

The main objects of treatment in tabes dorsalis are the relief of symptoms, particularly those associated with pain, and in this respect the results of anti-syphilitic treatment appear to be variable. Malarial therapy has also given good results, but there is a high mortality and A. E. Bennett (*The Journal of the American Medical Association*, September 12, 1936, cvii, 845) suggests a safer form of fever therapy which has given good results in combination with chemotherapy. For the production of fever, he has used an air-conditioned cabinet, known as the Kettering hypertherm and the patients have usually received fifty hours of fever, ranging from 105° to 106° F. in ten sessions. This treatment has uniformly relieved intractable lightning pains and gastric crises in patients for whom other active therapeutic measures had failed. Other resistant tabetic symptoms such as ataxia, bladder disturbances, headaches and paræsthesia were likewise improved in the majority of patients.

RHINOSCLEROMA TREATED BY X-RAYS

The condition of rhinoscleroma, although not common in this country, produces such terrible deformity of the nose with such extensive foul-smelling ulceration that any form of treatment which can alleviate the condition must be welcomed. G. Peter (*Radiology*, September, 1936, xxvii, 367) records his experiences with X-ray treatment. Fifteen years ago he first tried the effect of small doses of X-rays at long intervals, mostly with the idea of clearing up the infection, and the results were so satisfactory that he has persisted with this method in other cases. He claimed that early mild cases can be healed in three months, and severe ones in about a year. The full details of the radiological technique are given in his paper and he suggests that the application of still higher doses in a shorter time by fractionated treatment may produce good results with less difficulty. He claims that he has seen no late damage develop and there has been no development of resistance on the part of the disease to radiation. The illustrations in his paper show very remarkable cosmetic results.

REVIEWS OF BOOKS

Modern Treatment of Diseases of the Respiratory System. By A. Lisle Punch, M.B., M.R.C.P., and F. A. Knott, M.D., M.R.C.P. London: J. & A. Churchill, 1936. Pp. viii and 295. Plates 96. Text-figures 31. Price 15s.

Contemporaries at Guy's Hospital, so rich in its traditions of clinical medicine and pathology, the authors have combined in the production of a book which, except in name, is an account of " recent advances " in our knowledge of the respiratory tract, beginning with the common cold and travelling downwards deals in the sixteenth and last chapter with diseases of the diaphragm. An extremely noticeable feature is the number of excellent skiagrams, and special mention may be directed to three illustrating epituberculosis, a condition of benign tuberculosis in children which invariably clears up without special treatment, and has been the subject of papers by Dr. H. C. Cameron. The problems of sanatorium tuberculosis are discussed in the same thoroughly sound manner as the other subjects; the possible drawbacks are frankly faced, and it is pointed out with some insistence that sanatorium treatment is only the first step in the cure of pulmonary tuberculosis. The section on the treatment of lobar pneumonia is illustrated by a sketch of an apparatus for venesection and by figures of the oxygen tents of Poulton's pattern used at Guy's hospital and of the Heidbrink form, which differs in technical details but not in therapeutic principles.

An Introduction to Psychological Medicine. By R. G. Gordon, M.D., D.Sc., F.R.C.P.E., N. G. Harris, M.D., B.S., D.P.M., and J. R. Rees, M.A., M.D., D.P.H. Oxford University Press. London: Humphrey Milford, 1936. Pp. x and 386. Price 10s. 6d.

This book is intended for the student and is an attempt to present the subject of psychological medicine along the lines which have been advocated in recent discussions on the medical curriculum. Thus the early chapters lead from physiology to psychology and are intended to follow directly the student's physiological lectures on the nervous system. Next comes psychopathology, intended to follow the student's course in pathology and for his final year are reserved sections on the psychoneuroses, the psychoses and on mental deficiency. The three authors are apparently responsible for the book as a whole and their various contributions and individual styles have been well knit together. In general the text avoids controversial and difficult issues and presents the subject in an attractive and readable form. Even so the average medical student will find some of the earlier sections on pure psychology difficult to master unless aided by a skilful teacher. To hear this book delivered as a course of lectures by its three authors would indeed be a most valuable education. In book form they must be regarded as a useful skeleton.

Saint Bartholomew's Hospital Reports. Vol. lxix. London: John Murray, 1936. Pp. xxvi and 413; illustrated. Price 15s.

The volume begins with *in memoriam* notices of Mr. Holmes Spicer, Dr. R. G. Canti, Sir Archibald Garrod, and Sir Wilmot Herringham.

Among the subsequent thirteen articles that on the new Medical College of the hospital will naturally be of special interest to former students of this ancient school. In this account Mr. Girling Ball, Dean of the Medical College, points out that students attended the practice of the hospital as long ago as 1662, for the Governors gave the staff permission to carry on teaching and indeed provided a library " for the use of the Governors and the young University scholars." Much the longest article is that entitled " idiopathic jaundice (often recurrent) associated with subacute necrosis of the liver," by Dr. E. R. Cullinan. It occupies nearly a hundred pages and is generously illustrated by coloured plates. Drs. Bodley Scott and Robb-Smith contributed a valuable paper on progressive hyperplasia of the reticulo-endothelial system, in which they give a useful account of the constituents of the reticulo-endothelial system and a classification of diseases characterized by progressive hyperplasia of the mesenchyma; the relation of cases of true Hodgkin's disease to examples, of which they record three examples, formerly described as " a typical lymphadenoma," is an interesting problem on which this histological research throws light. Mr. Raven of the valuable Follow-up Department, analyses the results obtained in the treatment of 92 perforated gastric and 92 perforated duodenal ulcers; Mr. R. T. Payne analyses the post-mortem findings after partial gastrectomy in 51 cases; and Dr. Simon writes on the gastro-duodenal mucosal pattern with graduated compression, a result of the employment for many years of Barclay's technique for barium meal examination of the stomach. Dr. Levitt and Mr. Phillips report the results of deep X-ray therapy in malignant disease.

Appendicitis—When and How to Operate. By W. J. STEWART McKAY, M.B., B.Ch., B.Sc. Sydney, Australia and London : Angus and Robertson, Ltd., 1936. Pp. x and 260 with 16 figures. Price 12s.6d.

THIS is a pleasantly written book for the general practitioner, free and easy in its style, dealing out of the author's long experience, with the subject of what is nowadays the commonest abdominal emergency. The work of other experts is freely drawn upon both in the text and in the illustrations and the details, before, during and after the operation, whether this be for a simple inflammatory condition or something more complicated and dangerous, are fully set out. Practitioners should find this volume of considerable value not only for the particular subject with which it deals but also because of the many practical " tips " given which are applicable in general surgery.

Essentials of Modern Medical Treatment. By VINCENT NORMAN, M.D., M.R.C.P., F.R.C.S., D.P.H. London : Hutchinson's Scientific and Technical Publications, 1936. Pp. xvii and 200. Price 10s. 6d.

DR. S. WATSON SMITH contributes a foreword to this collection of notes on treatment in which he points out that Dr. Vincent Norman is a practitioner of many years' standing and the author himself claims that his aim has been to provide a work of ready reference, keeping strictly to essentials of treatment, avoiding unnecessary detail. The result is frankly not altogether satisfactory. For example the treatment of empyema in thirteen lines is an impossible feat of compression and several mis-statements result. In the treatment of rickets a dose of cod-liver oil is given (5 to 10 drops) which is hopelessly inadequate and in directions for preventing thrush it is advised to clean the mouth of all bottle-fed babies after every feed. These are examples found by random sampling which indicate that much careful revision would greatly improve this production.

Handbook for the Locum Tenens. By T. C. SCOTT WEBB, M.R.C.S., L.R.C.P. Oxford University Press. London: Humphrey Milford, 1936. Pp. viii and 72. Price 3s. 6d.

THIS should prove a valuable pocket guide to the difficult paths of locum tenens work. It has sections on general advice and on special points ranging from the method of keeping accounts to duties under the Road Traffic Act. A large part of the book is made up of a series of pages with appropriate headings whereby the locum tenens can quickly prepare a reference book and directory for use in the practice in which he is working.

THREE MEDICAL AUTOBIOGRAPHIES

A Doctor's Odyssey: Adventures in Forty-five Countries. By VICTOR HEISER, M.D. London: Jonathan Cape, 1936. Pp. 547 Price 15s.

FOR more than twenty years Dr. Heiser has travelled, in the service of the Rockefeller Foundation, in the cause of the prevention of disease, and has visited forty-five countries. Miraculously escaping drowning when a boy in a flood which made him an orphan, he has had many adventures which are vividly recorded; he has been saved by pure coincidence from almost certain death on at least four other occasions at places so far apart as New York, Mexico, on the road to Mandalay, and Bagdad. In 1901 as a result of the inspiration conveyed by reading Osler's "Practice of Medicine," Mr. J. D. Rockefeller founded the Institute for Medical Research and wide schemes for the prevention of disease, beginning with hookworm infestation. The author has thus met many interesting men, among them the late Professor W. H. Welch, whom he describes as a human dynamo with such a vivid personality that all present were electrified when he entered a room. As a missionary of preventive medicine he visited Addis Ababa in 1933 and interviewed the Emperor and tried to impress him with the benefit Abyssinia would obtain from the establishment of a sanitary organization.

The Intruder: An Unfinished Self-Portrait. By KENNETH WALKER. London: Lovat Dickson, Ltd. Pp. xi and 274. Price 9s.

THE second of these autobiographical volumes from the pen of a member of the medical profession is an ambitious attempt at self-analysis. Mr. Kenneth Walker is well recognized not only as an authority upon the genito-urinary system in its surgical aspects but he has also made sane contributions on the psychological aspects of the genital apparatus. This fact indicates that he has equipped himself with the necessary philosophical and psychological background for facing one of the only too often troublesome aspects of life. Here in this book is a frank account of such a background, full of general interest, and an eminently readable volume. Travelling in Switzerland and Egypt, a working spell in Buenos Ayres, a period of active service during the War and the development of a busy practice in the post-War years, afford opportunities for the mental development of those four sides of the author's personality which he designates by special names. In the end he goes back to the South Downs to straighten out his somewhat tangled philosophy—a " poor distracted spider." Mr. Walker's colleagues will share his difficulties and doubts with great interest and they will surely read this book with sympathetic attention.

Years of Endurance. By Surgeon Rear-Admiral JOHN R. MUIR. London: Philip Allan, 1936. Pp. 292. Illustrations 8. Price 12s. 6d.

THE present preparations for war have been accompanied by, perhaps in some degree responsible for, the publication of two books recording the experiences of medical men in the War of twenty years ago. Earlier in the year Professor Harvey Cushing's " Surgeon's Journey " received a good press, and now Surgeon Rear-Admiral Muir gives a graphic account of his War experiences in the North Sea, especially of the battle of Jutland, in the early part of the War.

NEW EDITIONS

The Queen Charlotte's Textbook of Obstetrics (J. & A. Churchill, Ltd., 18s.), now in its fourth edition with several new contributions in accordance with changes in the clinical staff of the hospital, is notable for the accounts given of the completely new outlook on puerperal sepsis made possible by laboratory and chemical advances of recent times. The sections dealing with vomiting and with the toxæmias of pregnancy have been completely rewritten. The whole purpose of the book is to give a composite picture of established practice at Queen Charlotte's Hospital and the changes throughout reflect the present teaching at that institution.

Physiological Principles in Treatment. By SIR WALTER LANGDON-BROWN, M.D., F.R.C.P., and R. HILTON, M.D., F.R.C.P. (Baillière, Tindall and Cox, 10s. 6d.) This well-known and popular work was originally brought out by the senior author in 1908, and the sixth edition came out in 1930. During this interval great advances have taken place, especially in the subjects of hormones, on which Sir Walter Langdon-Brown has written with such effect, and of vitamins, which open this volume. The digestive, renal, and cardiovascular systems are then considered in clear and concise language. The last chapter sets out what every medical student should know about allergy and some allergic diseases, such as asthma, urticaria, hay fever, and angioneurotic œdema. A well-chosen list of references closes this familiar, favourite and up-to-date handbook.

NOTES AND PREPARATIONS

NEW PREPARATIONS

Acigen.—This is a combination of mandelic acid, sodium bicarbonate, ammonium biphosphate and flavouring agents, prepared in the form of granules of which the suggested dose of two teaspoonsful four times a day represents a daily intake of 12 gm. of mandelic acid. It is claimed by the manufacturers—Pharmaceutical Specialities (May & Baker), Ltd., Dagenham—that its use does away in most cases with the necessity for supplementary administration of ammonium chloride. Bottles of 6 oz. cost 10*s.*

Colsulanyde.—The Crookes Laboratories, Park Royal, London, N.W.10, present the new anti-streptococcal drug, sulphanilamide, in three forms, a suspension, as a powder and in capsules. Extensive clinical trials indicate that 3 to 5 gm. daily of the drug, divided into three or four doses, give very striking results in all streptococcal infections of the blood stream and associated conditions. The three preparations of "colsulanyde" are sold as follows: Suspension (each teaspoonful contains 0.5 gm.) in 4 oz. bottles, each 5*s.* 6*d.*; Powders (each containing 7½ grains) in boxes of 24, 5*s.* 6*d.*; and Capsules (each containing 0.25 gm.) in vials of 50, 8*s.* 6*d.*

Collosal Brand Halibut Oil Ointment.—Packed in 1 oz. pots costing 1*s.* 6*d.* each this new ointment offers the tissue-healing properties of vitamin D in a most potent form. It should have a wide utility in general practice in many infected conditions of the skin and can be obtained from The Crookes Laboratories, Park Royal, London, N.W.10.

Hepferol.—This is a preparation of granules containing iron and liver. Each 100 gm. is stated to contain as much vitamin-B containing liver substance as corresponds to over 2 lb. of fresh liver and 5 gm. of active iron. The suggested dose is one teaspoonful three times a day. It is marketed by Coates and Cooper, Ltd., 94, Clerkenwell Road, London, E.C.1, in packages of 4 oz (price. 4*s.* 6*d.*) and 8 oz. (price 9*s.* 6*d.*).

Perandren Ampoules.—Issued in boxes of four ampoules of 1.1 c.cm. each containing 5 mgm. of testosterone propionate for subcutaneous or intramuscular injection, this preparation represents a synthetic form of one of the important male hormones. A limited number of samples of this product are available to the medical profession for careful clinical trial. Application should be made to Ciba Limited, 40, Southwark Street, London, S.E.1.

Salvacid.—This is composed of ox-bile derivatives combined with the antispasmodic principle of sage and parathyroid extract, together with very mild doses of alkalies. It is claimed that such a combination presents a specific treatment for gastric and duodenal ulcer, gastritis, hyperacidity and allied conditions. Coates and Cooper, Ltd., 94, Clerkenwell Road, London, E.C.1, are marketing this product in bottles of 50 tablets, price 4*s.* 6*d.*

FAREX AND OSTOCALCIUM

Glaxo Laboratories, Ltd., Greenford, Middlesex, announce the reduction in price of Farex, the reinforced cereal food. The 1 lb. Farex pack is to be 1*s*. 9*d*. instead of 2*s*. and a new " introductory" size is being sold at 1*s*. It is also announced that owing to rapidly increasing sales the price of the well-known tablet containing calcium and vitamin D (Ostocalcium) has also been reduced.

WARNERS CALENDAR, 1937

The well-known Calendar of Medical History issued annually for the use of the medical profession by William R. Warner & Co., Ltd., 300, Gray's Inn Road, London, W.C.1, is now available and contains on this occasion, in addition to its usual features of historical notes at the foot of each page, a series of notes and useful statistics on medical topics. Copies of this most attractive publication are available for the medical profession. This firm announces a change of address after January 1, 1937, to Power Road, Chiswick, London, W.4.

TEA

The Empire Tea Marketing Expansion Bureau, an association representing the producers of tea in India and Ceylon, with no connexion whatever with proprietary selling, has issued to the medical profession an interesting booklet entitled " A New Essay upon Tea." After an historical introduction the main section of the booklet embodies the results of the laboratory and clinical research work on the cup of tea, which has recently been carried out by recognized authorities. Perhaps even more important are the directions which conclude the whole matter by giving directions for providing " a delicious and wholesome brew." The book is illustrated by drawings by Edward Bawden, and the typography is of a high standard throughout.

A NEW ROUND GAME

We have received from Messrs. John Waddington, Ltd., a set of the new game " Monopoly." This is a round game for three to seven people which is already receiving the same popularity in London as in its country of origin, the United States of America, where it is stated to have swept the country from coast to coast. The game is of great interest, demanding the use of intelligence as well as good fortune, and enthralling hours can be spent in the realm of high finance and real estate. The rules are exceptionally well set out, and the game can be recommended as a gift to convalescent patients. The price of sets ranges from 7*s*. 6*d*. to two guineas.

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